T. O. NO. 08-15-2

ARMY AIR FORCES RADIO DATA AND FLIGHT INFORMATION

AIRCRAFT MODEL — CALL LETTERS

FOR CLASSROOM USE ONLY

NOTE: This Technical Order replaces T. O. No. 08-15-2 dated 1 March 1944. Distribution of this Technical Order is outlined on page A.

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By Command of General ARNOLD:

BENNETT E. MEYERS,
Major General, U.S.A.
Deputy Director,
Air Technical Service Command

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BAROMETRIC INCHES (Mercury) INTO MILLIBARS

1 inch = 33.86395 mb.

Inches	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
28.0	948.2	948.5	948.9	949.2	949.5	949.9	950.2	950.6	950.9	951.2
28.1	951.6	951.9	952.3	952.6	952.9	953.3	953.6	953.9	954.3	954.6
28.2	955.0	955.3	955.6	956.0	956.3	956.7	957.0	957.3	957.7	958.0
28.3	958.3	958.7	959.0	959.4	959.7	960.0	960.4	960.7	961.1	961.4
28.4	961.7	962.1	962.4	962.8	963.1	963.4	963.8	964.1	964.4	964.8
28.5	965.1	965.5	965.8	966.1	966.5	966.8	967.2	967.5	967.8	968.2
28.6	968.5	968.8	969.2	969.5	969.9	970.2	970.5	970.9	971.2	971.6
28.7	971.9	972.2	972.6	972.9	973.2	973.6	973.9	974.3	974.6	974.9
28.8	975.3	975.6	976.0	976.3	976.6	977.0	977.3	977.7	978.0	978.3
28.9	978.7	979.0	979.3	979.7	980.0	980.4	980.7	981.0	981.4	981.7
29.0	982.1	982.4	982.7	983.1	983.4	983.7	984.1	984.4	984.8	985.1
29.1	985.4	985.8	986.1	986.5	986.8	987.1	987.5	987.8	988.2	988.5
29.2	988.8	989.2	989.5	989.8	990.2	990.5	990.9	991.2	991.5	991.9
29.3	992.2	992.6	992.9	993.2	993.6	993.9	994.2	994.6	994.9	995.3
29.4	995.6	995.9	996.3	996.6	997.0	997.3	997.6	998.0	998.3	998.6
29.5	999.0	999.3	999.7	1000.0	1000.4	1000.7	1001.0	1001.4	1001.7	1002.0
29.6	1002.4	1002.7	1003.1	1003.4	1003.7	1004.1	1004.4	1004.7	1005.1	1005.4
29.7	1005.8	1006.1	1006.4	1006.8	1007.1	1007.5	1007.8	1008.1	1008.5	1008.8
29.8	1009.1	1009.5	1009.8	1010.2	1010.5	1010.8	1011.2	1011.5	1011.9	1012.2
29.9	1012.5	1012.9	1013.2	1013.5	1013.9	1014.2	1014.6	1014.9	1015.2	1015.6
30.0	1015.9	1016.3	1016.6	1016.9	1017.3	1017.6	1018.0	1018.3	1018.6	1019.0
30.1	1019.3	1019.6	1020.0	1020.3	1020.7	1021.0	1021.3	1021.7	1022.0	1022.4
30.2	1022.7	1023.0	1023.4	1023.7	1024.0	1024.4	1024.7	1025.1	1025.4	1025.7
30.3	1026.1	1026.4	1026.8	1027.1	1027.4	1027.8	1028.1	1028.4	1028.8	1029.1
30.4	1029.5	1029.8	1030.1	1030.5	1030.8	1031.2	1031.5	1031.8	1032.2	1032.5
30.5	1032.9	1033.2	1033.5	1033.9	1034.2	1034.5	1034.9	1035.2	1035.6	1035.9
30.6	1036.2	1036.6	1036.9	1037.3	1037.6	1037.9	1038.3	1038.6	1038.9	1039.3
30.7	1039.6	1040.0	1040.3	1040.6	1041.0	1041.3	1041.7	1042.0	1042.3	1042.7
30.8	1043.0	1043.3	1043.7	1044.0	1044.4	1044.7	1045.0	1045.4	1045.7	1046.1
30.9	1046.4	1046.7	1047.1	1047.4	1047.8	1048.1	1048.4	1048.8	1049.1	1049.5
31.0	1049.8	1050.1	1050.5	1050.8	1051.1	1051.5	1051.8	1052.2	1052.5	1052.8

ALTITUDE PRESSURE TABLE FEET-INCHES

Inches	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
28.0	1824	1814	1805	1795	1785	1776	1766	1756	1746	1737
28.1	1727	1717	1707	1698	1688	1678	1668	1659	1649	1639
28.2	1630	1620	1610	1601	1591	1581	1572	1562	1552	1542
28.3	1533	1523	1513	1504	1494	1484	1475	1465	1456	1446
28.4	1436	1427	1417	1407	1398	1388	1378	1369	1359	1350
28.5	1340	1330	1321	1311	1302	1292	1282	1273	1263	1254
28.6	1244	1234	1225	1215	1206	1196	1186	1177	1167	1158
28.7	1148	1139	1129	1120	1110	1100	1091	1081	1072	1062
28.8	1053	1043	1034	1024	1015	1005	995	986	976	967
28.9	957	948	938	929	919	910	900	891	881	872
29.0	863	853	844	834	825	815	806	796	787	777
29.1	768	758	749	739	730	721	711	702	692	683
29.2	673	664	655	645	636	626	617	607	598	589
29.3	579	570	560	551	542	532	523	514	504	495
29.4	485	476	467	457	448	439	429	420	410	401
29.5	392	382	373	364	354	345	336	326	318	308
29.6	298	289	280	270	261	252	242	233	224	215
29.7	205	196	187	177	168	159	149	140	131	122
29.8	112	103	94	85	75	66	57	47	38	29
29.9	20	10	+1	−8	−17	−26	−36	−45	−54	−63
30.0	−73	−82	−91	−100	−110	−119	−128	−137	−146	−156
30.1	−165	−174	−183	−192	−202	−211	−220	−229	−238	−248
30.2	−257	−266	−275	−284	−293	−303	−312	−321	−330	−339
30.3	−348	−358	−367	−376	−385	−394	−403	−412	−421	−431
30.4	−440	−449	−458	−467	−476	−485	−494	−504	−513	−522
30.5	−531	−540	−549	−558	−567	−576	−585	−594	−604	−613
30.6	−622	−631	−640	−649	−658	−667	−676	−685	−694	−703
30.7	−712	−721	−730	−740	−749	−758	−767	−776	−785	−794
30.8	−803	−812	−821	−830	−839	−848	−857	−866	−875	−884
30.9	−893	−902	−911	−920	−929	−938	−947	−956	−965	−974
31.0	−983	−992	−1001	−1010	−1019	−1028	−1037	−1046	−1055	−1064

BROADCASTING STATIONS IN THE UNITED STATES 550 TO 1550 KCS.

Broadcasting Stations in the U.S., 550 to 1550 kcs.—It is intended that the remarks below serve as a guide to limitations in the use of these stations as aids to aerial radio navigation.

a. The list of entertainment band stations has been compiled from information secured from the various stations listed. The information was checked in so far as possible with publications of the Federal Communications Commission. Any errors noted should be reported to the Hq. A.S.C., Patterson Field, Ohio. Stations on the "Local" frequency channels are not covered in the tabulations, their usefulness for aerial navigation being very limited, due to low power and the number of stations near each other operating on the same frequency.

b. The following points should be borne in mind in the use of these stations as aids to radio navigation:

(1) The frequencies contained in the band used by the commercial broadcasting stations are not as satisfactory for homing and direction finding as the lower frequencies used by the established navigational radio facilities due to the fact that the ground wave, the only part of the transmitted wave suitable for direction finding or homing with a loop type compass, dies out in a much shorter distance.

(2) Any one frequency (excepting "clear" frequencies) in the commercial broadcast band is shared by a number of stations. No great attempt is made to prevent interference as it is contemplated that each of these stations will serve a particular community and, when within the short range of each particular station, all other stations on the shared frequency are drowned out by the stronger signal of the other station. For direction finding purposes this would prove extremely dangerous as, under instrument conditions with unknown wind direction and velocity, the pilot could easily be led to a station other than that toward which he desired to fly. This is not true with the established radio navigational facilities, as extreme care has been exercised in the zoning of stations which might be using the same frequency. In this connection, the ground wave of the nearby weaker broadcasting station might be overridden by the sky wave (untrue wave) of a far distant broadcast station. This phenomen has been noted while flying over Wright Field in that when a station at Columbus, Ohio, only 60 miles away, (WHKC, power 500 watts) was tuned in on 640 kcs, the radio compass picked up the sky wave and indicated the general direction toward KFI (power 50,000 watts) on 640 kcs, located in Los Angeles. Therefor, even at close range, radio phenomena in the broadcast band due to the particular assignment of the frequencies in this range might cause grave error to personnel when flying on instruments and relying solely on these stations. In some cases two stations located in different cities on shared time use broadcasting studios located in the respective cities and their identification is given as of those cities, whereas the transmitter is the same for both and is located at a spot remote from either city. In other cases one station operates only part time during the day and another station, generally nearby but with a different transmitter location, uses the same frequency for the remainder of the day.

c. In the list by "States and Cities" the abbreviations LSR (Local Sunrise) and LS (Local Sunset), are used in the column 'Hours of Operation'. Local standard time is given in each instance.

d. Power in watts is shown under that heading. Many of the stations operate under reduced power after local sunset, but, due to increased signal range obtained after dark, little difference will be found in the signal strength of such stations.

e. The information shown under 'Location from City' was furnished by the various broadcasting stations. It was found that these locations are approximate only.

LOCATION BY STATES	FREQ. IN KCS	CALL	POWER IN WATTS	HOURS OF OPERATION	LOCATION		
					LAT. NORTH	LONG. WEST	FROM CITY
ALABAMA							
Birmingham	610	WSGN	5,000	0600-2400	33 29 38	86 47 20	3 Miles SW
	960	WBRC	5,000	0530-2400	33 32 02	86 51 09	2 Miles WNW
	1070	WAPI	5,000	0600-2400	33 33 14	86 54 44	5 miles WNW
Mobile	1410	WALA	5,000	0600-2305	30 40 52	88 00 02	3 Miles E.
Montgomery	1440	WSFA	1,000	0600-2230	32 19 27	86 17 00	3 Miles SSE
ARIZONA							
Phoenix	550	KOY	1,000	0600-2300	33 30 30	112 03 29	4 Miles N
	620	KTAR	5,000	0600-2400	33 28 37	112 00 08	3 Miles NE
Tucson	1290	KVOA	1,000	0600-2330	32 14 28	110 58 32	1 Mile NW
ARKANSAS							
Blytheville	900	KLCN	1,000	0600-LS	35 55 45	89 51 25	3 Miles E
Hot Springs	1090	KTHS	10,000	0600-2400	34 29 00	93 02 24	2 Miles S
Little Rock	920	KARK	5,000	0900-2230	34 46 31	92 14 34	3 Miles NE
	1010	KLRA	10,000	0600-2305	34 46 10	92 09 36	8 Miles ENE
Siloam Springs	1290	KUOA	5,000	0600-LS	36 11 27	94 33 56	1 Mile W

LOCATION BY STATES	FREQ. IN KCS	CALL	POWER IN WATTS	HOURS OF OPERATION	LOCATION		
					LAT. NORTH	LONG. WEST	FROM CITY
CALIFORNIA							
Bakersfield	1410	KERN	1,000	0600-2400	35 20 12	119 02 16	3 Miles SW
	1560	KPMC	1,000	0700-2400	35 22 37	118 59 52	1 Mile ENE
Beverly Hills	710	KMPC	10,000	0600-2400	34 10 24	118 24 24	13 Miles NNW of Los Angeles
Chico	1290	KHSL	1,000	0630-2300	39 44 45	121 48 54	2 Miles NE
Eureka	1480	KIEM	1,000	0700-2230	40 48 09	124 08 20	2 Miles NE
Fresno	1430	KARN	5,000	0600-2400	36 50 25	119 50 05	7 Miles NNW
	580	KMJ	5,000	Cont.	36 41 42	120 03 18	16 Miles SW
Long Beach	1280	KFOX	1,000	0700-2400	33 46 57	118 11 24	1 Mile W
	1390	KGER	5,000	0700-2300	33 48 53	118 12 12	3 Miles NNW
Los Angeles	570	KMTR	1,000	0600-0100	34 05 17	118 19 45	6 Miles NW
	640	KFI	50,000	Cont.	33 52 42	118 00 51	7 Miles WNW
	790	KECA	5,000	0600-2400	34 01 41	118 22 23	6 Miles W
	930	KHJ	5,000	Cont. except 1201-0600 Mon.	34 02 28	118 22 14	6 Miles WNW
	980	KFWB	5,000	0600-2400	34 01 23	118 22 25	7 Miles W
	1070	KNX	50,000	Cont. except 0115-0445 Sun.	33 51 35	118 21 01	13 Miles SSW
	1020	KFVD	1,000	0600-2400	34 02 16	118 23 48	8 Miles W
	1150	KRKD	2,500	0700-2000	34 05 35	118 15 37	5 Miles N
	1150	KFSG	2,500	Intermittent	34 04 36	118 15 37	4 Miles N
	1330	KFAC	1,000	Cont. except 0400-0600 Wed.	34 03 00	118 22 30	7 Miles WNW
Modesto	860	KTRB	1,000		37 41 15	120 59 00	4 Miles N
Oakland	910	KLX	1,000	0700-0230	37 48 05	122 16 15	3 Miles WSW
	960	KROW	1,000	0700-2400	37 47 34	122 14 58	2 Miles SW
	1310	KLS	1,000	0700-0100	37 47 00	122 12 00	3 Miles SE
Pasadena	1110	KPAS	10,000	0600-2400	34 02 27	118 02 13	10 Miles SE
	1430	KWKW	1,000	0600-LS	34 06 48	118 05 24	5 Miles SE
Riverside	1440	KPRO	1,000	0700-2200	33 59 39	117 21 34	2 Miles NE
Sacramento	1530	KFBK	10,000	Cont.	38 34 30	121 34 24	5 Miles W
San Diego	600	KFSD	1,000	0700-2400	32 42 51	117 09 46	2 Miles SSW
	1360	KGB	1,000	0600-2400	32 42 50	117 09 55	2 Miles SW
San Francisco	560	KSFO	5,000	0700-2400	37 44 43	122 22 41	3 Miles ESE
	610	KFRC	5,000	0600-2400	37 46 59	122 25 15	1 Mile N
	680	KPO	50,000	Cont. except 0001-0600 Mon.	37 32 47	122 14 00	19 Miles SE
	810	KGO	7,500	Cont.	37 45 52	122 12 19	12 Miles E
	1260	KYA	5,000	0600-2400	37 42 53	122 23 46	5 Miles SSE
San Jose	740	KQW	5,000	0600-2400	37 25 51	121 57 17	8 Miles NNW
Santa Barbara	1250	KTMS	1,000	0700-2300	34 25 24	119 48 48	7 Miles W
Santa Rosa	1350	KSRO	1,000	0700-2200	38 24 05	122 47 45	5 Miles SW
Stockton	1140	KGDM	5,000	0600-2400	37 54 24	121 13 36	5 Miles SE
Visalia	940	KTKC	5,000	0530-2300	36 19 24	119 19 00	2 Miles WSW
COLORADO							
Colorado Springs	1300	KVOR	1,000	0630-2330	38 50 08	104 46 15	3 Miles E
Denver	560	KLZ	5,000	0600-2400	39 39 26	104 57 51	7 Miles S
	630	KVOD	5,000		39 47 54	105 00 00	4 Miles NNW
	850	KOA	50,000	0530-2400	39 44 22	104 46 50	11 Miles E
	910	KPOF	1,000	Intermittent	39 51 00	105 02 30	8 Miles NNW
	950	KFEL	5,000	0600-2400	39 44 57	105 03 14	5 Miles W
Grand Junction	920	KFXJ	1,000	0700-2400			
Greeley	910	KFKA	1,000		40 26 34	104 41 46	2 Miles N
CONNECTICUT							
Bridgeport	600	WICC	1,000	0600-0200	41 09 40	73 10 00	3 Miles SE
Hartford	1080	WTIC	50,000	0600-0100	41 46 38	72 48 17	6 Miles WNW
	1360	WDRC	5,000	0700-2400	41 48 48	72 41 50	3 Miles N
	1410	WNBC	5,000	0700-2400	41 41 34	72 45 09	7 Miles SW
New Haven	960	WELI	1,000	0700-0100	41 22 03	72 56 16	4 Miles N
Waterbury	1320	WATR	1,000	0800-2400	41 32 13	73 01 53	1 Mile S
	1590	WBRY	1,000	0800-2400	41 35 27	73 02 28	14 Miles WNW of Meriden
DELAWARE							
Wilmington	1150	WDEL	5,000	0600-0100	39 45 04	75 31 08	3 Miles E
DIST. OF COLUMBIA							
Washington	630	WMAL	5,000	0600-0100	39 00 55	77 08 29	9 Miles NW
	980	WRC	5,000	0600-0100	38 57 47	76 58 28	5 Miles NE
	1260	WOL	1,000	Cont. except 0005-0600 Mon.	38 57 48	76 58 18	6 Miles NE
	1500	WTOP	50,000	0600-0105	39 02 36	77 02 56	9 Miles N
FLORIDA							
Ft. Lauderdale	710	WFTL	10,000	0800-2400	26 05 55	80 15 50	9 Miles WSW
Gainsville	850	WRUF	5,000	0600-LS	29 38 39	82 20 35	2 Miles WSW
Jacksonville	930	WJAX	5,000	0600-2400	30 17 06	81 44 48	6 Miles WSW
	1270	WPDQ	5,000	0629-0005	30 18 00	81 45 36	6 Miles WSW

LOCATION BY STATES	FREQ. IN KCS	CALL	POWER IN WATTS	HOURS OF OPERATION	LOCATION		
					LAT. NORTH	LONG. WEST	FROM CITY
FLORIDA (Continued)							
Miami	560	WQAM	1,000	Cont.	25 47 22	80 11 09	3 Miles NE
	610	WIOD	5,000	0630-2400	25 50 58	80 09 17	7 Miles NE
Miami Beach	1360	WKAT	1,000	0630-2400	25 47 12	80 08 24	1 Mile SSW
Orlando	580	WDBO	5,000	Cont.	28 35 27	81 22 28	4 Miles N
Pensacola	1370	WCOA	1,000	0600-2400	30 24 53	87 11 34	1 Mile E
St. Petersburg	620	WSUN	5,000	Cont. except 2300 Sun.-0400 Mon.	27 57 30	82 42 09	14 Miles N
	1380	WTSP	1,000	0630-2400	27 48 27	82 38 14	4 Miles NE
Tampa	970	WFLA	5,000	0645-0005	27 57 51	82 32 26	6 Miles W
	1250	WDAE	5,000	0700-0005	28 02 24	82 28 08	5 Miles N
GEORGIA							
Albany	1590	WALB	1,000		31 37 12	84 09 09	3 Miles N
Atlanta	590	WAGA	5,000	0600-2400	33 49 33	84 18 54	6 Miles NE
	750	WSB	50,000	0545-0105	33 50 58	84 15 12	10 Miles NE
	920	WGST	5,000	0600-2400	33 48 36	84 21 20	3 Miles N
Augusta	1480	WRDW	5,000	0600-2400	33 31 02	82 00 30	4 Miles NNW
Macon	940	WMAZ	5,000	0600-2400	32 53 20	83 43 59	7 Miles NW
Savannah	1290	WTOC	5,000	0630-2400	32 05 25	81 08 55	4 Miles NW
IDAHO							
Boise	1380	KIDO	2,500	0600-2300	43 38 56	116 15 50	3 Miles SW
Idaho Falls	1350	KID	5,000	0600-2200	43 30 50	112 00 45	2 Miles NE
Pocatello	930	KSEI	1,000	0600-2300	42 54 18	112 27 03	3 Miles N
Twin Falls	1270	KTFI	1,000	0600-2300	42 33 36	114 32 09	5 Miles WNW
ILLINOIS							
Chicago	670	WMAQ	50,000	0600-0100	41 56 00	88 04 21	20 Miles WNW
	720	WGN	50,000	0530-0135	42 00 41	88 02 10	21 Miles NW
	780	WBBM	50,000	0530-0115	41 59 06	88 01 30	20 Miles NW
	820	WAIT	5,000		41 55 34	87 56 57	14 Miles WNW
	890	WLS	50,000	Intermittent	41 33 21	87 50 54	21 Miles SSW
	890	WENR	50,000	Intermittent	41 33 21	87 50 54	21 Miles SSW
	950	WAAF	1,000	0600-LS	41 48 48	87 38 30	4 Miles ESE
	1000	WCFL	10,000	0600-0005	41 49 05	87 59 18	15 Miles W
	1110	WMBI	5,000		41 55 18	88 00 12	17 Miles WNW
	1160	WJJD	20,000		42 01 14	87 50 08	4 Miles ESE of Des Plaines
	1390	WGES	5,000	0945-2400			
Peoria	1470	WMBD	5,000	0545-2400	40 37 32	89 37 16	5 Miles S
Quincy	930	WTAD	1,000	0600-0005	39 53 28	91 25 27	4 Miles SSW
Rockford	1440	WROK	1,000	0600-2400	42 18 58	89 07 58	4 Miles NW
Rock Island	1270	WHBF	5,000	0600-2400	41 29 35	90 27 34	5 Miles E
Tuscola	1050	WDZ	1,000	LSR-LS	39 50 05	88 16 12	2 Miles NNE
Urbana	580	WILL	5,000	LSR-LS	40 04 52	88 13 59	3 Miles SSW
INDIANA							
Evansville	1280	WGBF	5,000	0600-2400	37 59 53	87 28 33	6 Miles ENE
Fort Wayne	1190	WOWO	10,000	0500-0100	41 08 15	85 13 00	6 Miles NW
Gary	560	WIND	5,000	Cont. except 1400-1800 Mon.	41 33 49	87 23 55	4 Miles SW
Indianapolis	1070	WIBC	5,000	0500-2400	39 51 30	86 14 12	8 Miles NW
	1260	WFBM	5,000	0600-0005	39 51 42	86 03 40	8 Miles NE
	1310	WISH	5,000	0600-0100	39 45 30	86 01 20	7 Miles E
	1430	WIRE	5,000	0630-2400	39 49 06	86 11 06	5 Miles NW
South Bend	960	WSBT	1,000	0630-2400	41 38 26	86 12 30	3 Miles SE
West Lafayette	920	WBAA	5,000	1000-2200	40 20 28	86 53 04	6 Miles S
IOWA							
Ames	640	WOI	5,000	LSR-LS	42 01 51	93 38 52	2 Miles WNW
Cedar Rapids	600	WMT	5,000	0530-2400	42 03 52	91 32 33	9 Miles NE
Davenport	1420	WOC	5,000	0500-2400	41 32 54	90 28 37	6 Miles ENE
Des Moines	1040	WHO	50,000	0500-0100	41 39 10	93 21 00	15 Miles ENE
	1350	KRNT	5,000	0530-2400	41 33 32	93 34 38	3 Miles SE
	1460	KSO	5,000	0600-0100	41 33 34	93 34 40	3 Miles SE
Dubuque	1370	KDTH	1,000	0600-2400	42 29 07	90 38 36	3 Miles SE
Iowa City	910	WSUI	5,000	0800-2200	41 39 45	91 34 30	3 Miles W
Mason City	1300	KGLO	5,000	0600-2400	43 08 39	93 14 52	3 Miles W
Shenandoah	920	KFNF	1,000	Intermittent	40 46 17	95 23 08	In city
	960	KMA	5,000	0500-2400	40 46 51	95 20 45	2 Miles NE
Sioux City	1360	KSCJ	5,000	0600-2400	42 33 18	96 19 48	5 Miles NE
Waterloo	1540	KXEL	50,000	0600-2400			
KANSAS							
Coffeyville	690	KGGF	1,000	1600-2300	37 00 00	95 37 00	3 Miles S
Dodge City	1370	KGNO	1,000	0800-2000	37 45 02	100 02 35	2 Miles W
Lawrence	1250	KFKU	5,000		39 06 02	95 04 42	13 Miles NE
	1250	WREN	5,000	0700-2400	39 06 02	95 04 42	13 Miles NE
Manhatten	580	KSAC	1,000		39 10 44	96 34 06	Center of Manhatten

LOCATION BY STATES	FREQ. IN KCS	CALL	POWER IN WATTS	HOURS OF OPERATION	LOCATION		
					LAT. NORTH	LONG. WEST	FROM CITY
KANSAS (Continued)							
Pittsburgh	810	KOAN	1,000	LSR-LS	37 22 27	94 41 22	3 Miles SSE
Salina	1150	KSAL	1,000	0600-2400	38 50 42	97 38 04	1 Mile W
Topeka	580	WIBW	5,000	0500-2400	39 05 12	95 46 58	7 Miles WNW
Wichita	1070	KFBI	5,000	Cont.	37 45 46	97 19 58	5 Miles N
	1330	KFH	5,000	0530-2400	37 42 48	97 14 48	5 Miles ENE
KENTUCKY							
Louisville	840	WHAS	50,000	Cont.	38 15 40	85 25 39	19 Miles E
	970	WAVE	5,000	0600-2400	38 19 09	85 44 43	5 Miles N
LOUISIANA							
Baton Rouge	1150	WJBO	5,000	0630-2400	30 25 26	91 10 30	2 Miles SSW
New Orleans	870	WWL	50,000	0500-2400	30 02 18	90 14 35	11 Miles NW
	1280	WDSU	1,000	0700-2400	29 53 36	90 05 00	5 Miles S
	1350	WSMB	5,000	0700-2300	29 55 23	90 01 58	4 Miles SE
Shreveport	1130	KWKH	50,000	0500-0105	32 42 15	93 52 52	15 Miles NNW
	1480	KTBS	1,000	0630-2400	32 26 34	93 42 08	6 Miles SE
MAINE							
Bangor	620	WLBZ	5,000	0800-2400	44 49 45	68 47 08	2 Miles NNW
	910	WABI	5,000	0800-2400	44 46 44	68 44 22	3 Miles SE
Portland	560	WGAN	5,000	0630-0005	43 41 26	70 19 08	3 Miles NW
	970	WCSH	5,000	0615-2400	43 36 16	70 19 18	5 Miles SW
MARYLAND							
Baltimore	600	WCAO	5,000	0600-0105	39 23 16	76 43 13	8 Miles NW
	1090	WBAL	50,000	Cont.	39 22 30	76 46 12	10 Miles WNW
	1300	WFBR	5,000	0600-0100	39 15 28	76 37 48	4 Miles SSW
MASSACHUSETTS							
Boston	590	WEEI	5,000	0530-0105	42 24 19	71 05 10	5 Miles NNE
	850	WHDH	5,000	0630-0100	42 26 08	70 59 40	10 Miles NE
	950	WORL	1,000	LSR-LS	42 17 16	71 15 34	8 Miles WSW
	1030	WBZ	50,000	0600-0100	42 16 44	70 52 41	13 Miles ESE
		Station synchronized with WBZA, Springfield, Mass. Not suitable for homing.					
	1260	WNAC	5,000	0600-0100	42 18 00	71 00 42	6 Miles ESE
	1510	WMEX	5,000	0730-0030	42 16 29	71 01 58	6 Miles SE
Fall River	1480	WSAR	1,000	0730-2400	41 42 58	71 10 10	2 Miles N
Lawrence	680	WLAW	5,000	0600-0100	42 40 39	71 13 12	4 Miles SW
Springfield	1030	WBZA	1,000	0600-0100	42 08 23	72 33 28	3 Miles NNE
		Station synchronized with WBZ, Boston, Mass. Not suitable for homing.					
Worcester	580	WTAG	5,000	0630-0005	42 20 08	71 49 07	6 Miles N
	1310	WORC	1,000	0700-2400	42 13 22	71 49 02	3 Miles SSW
	1440	WAAB	5,000	0600-2400			
MICHIGAN							
Bay City	1440	WBCM	1,000	0700-0100	43 35 04	83 51 24	3 Miles ESE
Detroit	760	WJR	50,000	0530-2400	42 10 04	83 12 58	15 Miles SSW
	950	WWJ	5,000	0600-0100	42 26 48	83 10 23	6 Miles NNW
	1270	WXYZ	5,000	0630-2400	42 21 37	83 11 54	4 Miles WSW
East Lansing	870	WKAR	5,000	0700-1900	42 43 36	84 28 24	4 Miles E
Flint	910	WFDF	1,000	0700-2300	42 58 25	83 36 34	6 Miles SE of Grand Rapids
Grand Rapids	1300	WOOD	5,000	0630-2400	42 51 24	85 39 03	8 Miles S
Kalamazoo	590	WKZO	5,000	0700-2330	42 20 57	85 33 41	4 Miles NNE
Pontiac	1130	WCAR	1,000	LSR-LS	42 36 26	83 17 42	3 Miles S
MINNESOTA							
Duluth	610	KDAL	1,000	0630-2400	46 43 13	92 10 34	4 Miles SW
	1320	WEBC	5,000	0625-2400	46 41 30	92 06 24	5 Miles SSE
Minneapolis	770	WLB	5,000	0730-2015	45 00 03	93 11 00	5 Miles NE
	830	WCCO	50,000	Cont.	45 10 01	93 20 56	15 Miles NNW
	1130	WDGY	5,000	0600-Sunset MWT	44 58 09	93 22 13	6 Miles WNW
	1280	WTCN	5,000	0600-2400	45 00 30	93 10 00	6 Miles NE
	1330	WLOL	1,000	0600-2400	44 57 43	93 12 04	4 Miles ENE in St. Paul
Northfield	770	WCAL	5,000	0730-LS	44 27 41	93 04 17	5 Miles E
St. Paul	1500	KSTP	50,000	Cont.	45 01 31	93 03 00	7 Miles NE
MISSISSIPPI							
Jackson	1300	WJDX	5,000	0615-2315	32 23 02	90 09 26	6 Miles NNE
Meridian	910	WCOC	1,000	0700-2330	32 23 30	88 40 17	3 Miles NE
Vicksburg	1390	WQBC	1,000	0700-1800	32 19 48	90 50 57	2 Miles ESE

LOCATION BY STATES	FREQ. IN KCS	CALL	POWER IN WATTS	HOURS OF OPERATION	LOCATION		
					LAT. NORTH	LONG. WEST	FROM CITY
MISSOURI							
Clayton	850	KFUO	5,000	0645-2100	38 38 15	98 18 57	2 Miles SE
Kansas City	610	WDAF	5,000	0600-2400	38 59 03	94 37 40	9 Miles S of airport
	880	WHB	1,000	LSR-LS	39 07 33	94 33 54	4 Miles N
	980	KMBC	5,000	0530-2400	39 02 17	94 36 56	4 Miles SW
	1480	KCMO	5,000	0600-2400	39 05 58	94 31 12	3 Miles NE
St. Joseph	680	KFEQ	5,000	Cont.	39 49 43	94 48 20	5.5 Miles NNE
St. Louis	550	KSD	5,000	0530-0030	38 37 47	90 11 45	3 Miles E
	630	KXOK	5,000	Cont.	38 40 17	90 06 51	8 Miles ENE
	770	WEW	1,000	LSR-LS	38 38 12	90 14 04	1 Mile SE
	1120	KMOX	50,000	0530-0100	38 27 38	90 20 43	14 Miles SSW
	1380	KWK	5,000	0600-2400	38 43 05	90 13 30	6 Miles NNE
Springfield	560	KWTO	5,000	0500-2400	37 16 15	93 19 28	4 Miles NE
	1260	KGBX	5,000	0600-2400	37 15 51	93 19 05	3 Miles NE
MONTANA							
Billings	790	KGHL	5,000	0600-2300	45 43 09	108 36 21	7 Miles SW
Butte	1370	KGIR	5,000	0745-2300	46 00 37	112 38 08	5 Miles W
Great Falls	1310	KFBB	5,000	0700-2300	47 31 30	111 22 48	6 Miles W*
Missoula	1290	KGVO	5,000	0700-2300	46 54 34	114 03 28	4 Miles NW
Sidney	1480	KGCX	1,000	0700-2015	48 06 11	105 36 03	3 Miles ENE
NEBRASKA							
Grand Island	750	KMMJ	1,000	LSR-LS	40 54 06	98 11 20	9 Miles ESE
Lincoln	780	KFAB	10,000	0500-0005	40 49 41	96 41 38	2 Miles NW
Norfolk	1090	WJAG	1,000	0630-1800	42 02 03	97 26 48	2 Miles WNW
North Platte	1460	KGNF	1,000	0700-LS	41 09 00	100 47 00	2 Miles NW
Omaha	590	WOW	5,000	Cont.	41 19 00	95 59 52	5 Miles NNW
	1290	KOIL	5,000	0600-0005	41 12 54	95 52 39	5 Miles SE
NEVADA							
Reno	630	KOH	1,000	0645-2400	39 32 38	119 42 54	6 Miles ENE
NEW HAMPSHIRE							
Keene	1290	WKNE	5,000	0630-2315	42 57 06	72 18 36	2 Miles NW
Manchester	610	WMUR	5,000	0630-2400	43 00 57	71 28 25	2 Miles NNW
	1370	WFEA	5,000	0700-2400	42 54 35	71 27 42	6 Miles S
Portsmouth	750	WHEB	1,000	0600-LS	43 03 07	70 46 07	2 Miles S
NEW JERSEY							
Jersey City	1480	WHOM	1,000	0700-2400	40 42 40	74 02 08	2 Miles SE
Newark	970	WAAT	1,000	Cont.	40 45 42	74 06 45	4 Miles NW of Jersey City
	1280	WHBI	2,500	Sun. only	40 44 20	74 10 26	In city
Newark (Zarephath)	1380	WAWZ	5,000		40 31 48	74 34 12	4 Miles SE of Somerville
Patterson	930	WPAT	1,000	0800-2000	40 50 59	74 10 55	5 Miles SSW
Trenton	920	WTTM	1,000	1300-2400			
NEW MEXICO							
Albuquerque	1030	KOB	10,000	0600-2400	35 12 08	106 36 42	9 Miles NNE
	1260	KGGM	1,000	0600-2400	35 04 40	106 40 51	2 Miles W
NEW YORK							
Albany	1460	WOKO	1,000	0645-0005	42 41 08	73 47 37	3 Miles NW
Binghamton	1290	WNBF	5,000				
Brooklyn	1190	WLIB	1,000	LSR-LS			
	1430	WBYN	1,000	0700-0100			
Buffalo	550	WGR	5,000	0600-0200	42 46 12	78 50 48	10 Miles S
	930	WBEN	5,000	0600-0100	42 57 54	78 57 02	7 Miles NW
	1520	WKBW	50,000	Cont.	42 46 12	78 50 48	10 Miles S
Ithaca	870	WHCU	1,000	0645-LS	42 27 22	76 28 31	2 Miles ENE
Newburgh	1220	WGNY	1,000	LSR-LS	41 30 00	74 03 43	3 Miles W
New York	570	WMCA	5,000	0645-0115	40 45 08	74 06 23	5 Miles ENE of Newark
	660	WEAF	50,000	0630-0100	40 50 52	73 42 08	15 Miles ENE of Manhattan
	710	WOR	50,000	Cont.	40 35 46	74 14 54	12.5 Miles SW of Newark
	770	WJZ	50,000	Cont.	40 33 11	74 30 50	6 Miles NW of New Brunswick
	830	WNYC	1,000	0600-2200	40 43 42	73 57 30	4 Miles S of Manhattan
	880	WABC	50,000	Cont.	40 52 41	73 45 48	13 Miles NE of Manhattan
	1000	WINS	1,000		40 48 14	74 06 22	8 Miles WNW of Manhattan
	1050	WHN	50,000	0600-0200	40 48 11	74 04 13	6 Miles SSW of Hackensack

LOCATION BY STATES	FREQ. IN KCS	CALL	POWER IN WATTS	HOURS OF OPERATION	LOCATION		
					LAT. NORTH	LONG. WEST	FROM CITY
NEW YORK (Continued)							
	1130	WNEW	10,000	Cont.	40 45 30	74 06 48	5 Miles ENE of Newark
	1280	WOV	5,000	0700-2400	40 49 35	74 04 35	4 Miles SSW of Hackensack
	1330	WEVD	5,000	Intermittent	40 43 13	73 55 28	5 Miles SSE of Manhattan
	1380	WBNX	5,000		40 49 14	74 04 10	5 Miles SSW of Hackensack
	1560	WQXR	10,000	0830-2400	40 43 00	73 55 07	6 Miles SSE of Manhattan
Niagara Falls	1290	WHLD	1,000	LSR-LS	43 07 18	78 59 42	3 Miles NE
Rochester	1180	WHAM	50,000	Cont.	43 00 20	77 27 05	14 Miles SE
	1460	WHEC	1,000	0625-0030	43 10 15	77 39 42	2 Miles WNW
Schenectady	810	WGY	50,000	0600-0100	42 47 31	74 00 40	4 Miles SSW
Syracuse	570	WSYR	5,000	Cont.	42 59 17	76 09 08	5 Miles S
	620	WAGE	1,000	0600-2400	43 05 35	76 11 20	4 Miles NNW
	1390	WFBL	5,000	0615-0005	43 05 32	76 05 15	5 Miles NE
Troy	980	WTRY	1,000	0645-2400	42 46 30	73 44 55	
Watertown	790	WWNY	1,000	0700-2400			
NORTH CAROLINA							
Asheville	570	WWNC	1,000	0700-2400	35 35 42	82 33 19	1 Mile NE
Burlington	920	WBBB	1,000	0630-LS	36 05 50	79 29 03	3 Miles WNW
Charlotte	610	WAYS	1,000	0630-2400			
	1110	WBT	50,000	0500-0300	35 07 52	80 53 28	S of City
Concord	1410	WEGO	1,000	LSR-LS	35 24 30	80 36 40	2 Miles WNW
Greensboro	980	WGBG	1,000	0600-LS	36 02 06	79 47 30	3 Miles S
	1470	WBIG	5,000	0600-2400	36 06 50	79 50 30	5 Miles NW
Hickory	1290	WHKY	5,000		35 43 42	81 17 54	3 Miles E
Raleigh	680	WPTF	50,000	Cont.	35 47 36	78 45 48	7 Miles W
Washington	930	WRRF	1,000	LSR-LS	35 31 34	77 04 28	2 Miles SSW
Winston-Salem	600	WSJS	5,000	0600-0005			
NORTH DAKOTA							
Bismarck	550	KFYR	5,000	0630-2400	46 51 12	100 32 30	12 Miles ENE
Fargo	970	WDAY	5,000	0600-2400	46 52 36	96 53 10	5 Miles W
Grand Forks	1440	KFJM	1,000	1500-1700	47 55 12	97 04 32	2 Miles W
	1440	KILO	1,000	0700-1500 1700-2400	47 55 12	97 04 32	2 Miles W
Minot	1390	KLPM	1,000	0630-2230	48 12 38	101 14 25	3 Miles SE
OHIO							
Akron (Tallmadge)	1350	WADC	5,000	0630-2400	41 10 01	81 30 55	6 Miles N
	1590	WAKR	5,000	0630-0100	41 01 17	81 30 03	5 Miles S
Ashtabula	970	WICA	1,000	LSR-LS	41 48 58	80 46 42	5 Miles S
Cincinnati	550	WKRC	5,000	0600-0100	39 07 36	84 29 09	Center of Cincinnati
	700	WLW	50,000	Cont.	39 21 07	84 19 30	17 Miles NE
	1360	WSAI	5,000	0600-0200	39 14 55	84 31 47	8 Miles NNW
	1530	WCKY	50,000	0500-0100	39 03 55	84 36 28	8 Miles SW
Cleveland	1100	WTAM	50,000	0600-0100	41 16 47	81 37 22	15 Miles S
	1420	WHK	5,000	0645-0100	41 21 30	81 40 00	9 Miles S
	1480	WGAR	5,000	0600-0100	41 18 26	81 41 21	3 Miles S
Columbus	820	WOSU	5,000	0900-2030	40 01 51	83 03 21	6 Miles ESE
	1460	WBNS	5,000	0600-0100	39 57 02	82 54 22	5 Miles ESE
Dayton	1290	WHIO	5,000	0545-0005	39 40 43	84 07 50	7 Miles SSE
	1410	WING	5,000	0545-0100	39 44 18	84 07 18	4 Miles ESE
Findlay	1330	WFIN	1,000	0700-LS	41 00 34	83 38 04	2 Miles SSE
Toledo	1370	WSPD	5,000	0600-0005	41 36 00	83 32 08	5 Miles SSE
Youngstown	570	WKBN	5,000	0600-2400	41 03 29	80 38 47	3 Miles S
OKLAHOMA							
Enid	1390	KCRC	1,000	0630-2305	36 25 06	97 52 24	2 Miles NNE
Norman	640	WNAD	1,000	0900-LS	35 12 20	97 26 10	2 Miles SE
Oklahoma City	930	WKY	5,000	0600-2330	35 33 24	97 30 24	5 Miles NW
	1520	KOMA	5,000	0555-2400	35 33 42	97 28 41	7 Miles NNE
Tulsa	1170	KVOO	50,000	0555-2330	36 08 43	95 48 22	10 Miles E
	1430	KTUL	5,000	0600-2330	36 14 10	95 57 16	6 Miles NNE
OREGON							
Corvallis	550	KOAC	5,000	0600-2400	44 38 59	123 11 31	6 Miles NE
Medford	1440	KMED	1,000		42 20 32	122 54 32	2 Miles NW
Portland	620	KGW	5,000	0600-2400	45 36 05	122 41 09	6 Miles NW
	750	KXL	10,000	0600-LS	45 26 12	122 34 29	7 Miles SSE
	970	KOIN	5,000	Cont.	45 30 57	122 43 54	5 Miles W
	1080	KWJJ	1,000	0600-0100	45 27 24	122 39 36	5 Miles SSW
	1190	KEX	5,000	0600-2400	45 36 22	122 41 15	7 Miles NW
	1330	KALE	5,000	1645-2400	45 31 03	122 44 04	6 Miles W
Salem	1390	KSLM	1,000	0630-2330	44 56 55	123 02 42	2 Miles NW

LOCATION BY STATES	FREQ. IN KCS	CALL	POWER IN WATTS	HOURS OF OPERATION	LOCATION		
					LAT. NORTH	LONG. WEST	FROM CITY
PENNSYLVANIA							
Harrisburg	1460	WHP	5,000	0600-0100	40 15 20	76 49 47	3 Miles ESE
New Castle	1280	WKST	1,000	0700-2400	40 57 18	80 19 03	3 Miles SSE
Philadelphia	560	WFIL	1,000	0545-0100	39 54 47	75 12 32	6 Miles SSW
	610	WIP	5,000	Cont.	39 51 56	75 06 29	9 Miles SSE
	950	WPEN	5,000	0645-2400	39 58 32	75 16 15	6 Miles WSW
	990	WBIG	10,000				
	1060	KYW	50,000	0600-0100	40 06 13	75 15 00	4 Miles SSW of Ambler
	1210	WCAU	50,000	0500-0100	39 58 42	74 59 18	9 Miles ENE
Pittsburgh	1020	KDKA	50,000	Cont. except 0000-0600 Tue.	40 33 31	79 57 10	10 Miles N
	1250	WCAE	5,000	0645-0200	40 23 49	79 57 43	3 Miles SSW
	1320	WJAS	5,000	0730-0030	40 24 49	80 02 20	5 Miles W
	1410	KQV	1,000	0730-0030	40 24 49	80 02 20	5 Miles W
Reading	850	WEEU	1,000	LSR-LS	40 20 52	75 59 21	3 Miles W
Scranton	910	WGBI	1,000	0645-0100	41 24 41	75 36 11	3 Miles ESE
Sharon	790	WPIC	1,000	0600-LS	41 13 11	80 28 24	13 Miles W of Mercer
Uniontown	590	WMBS	1,000	0700-0005	39 51 35	79 44 46	3 Miles SSW
York	900	WSBA	1,000	LSR-LS	39 59 56	76 44 44	3 Miles NNW
	1350	WORK	1,000	0700-0100	39 56 02	76 48 59	5 Miles WSW
RHODE ISLAND							
Pawtucket	1420	WFCI	1,000	0555-0105	41 54 16	71 24 07	6 Miles N of Providence
Providence	630	WPRO	5,000	0600-0105	41 46 28	71 19 23	6 Miles SE
	790	WEAN	5,000	0600-0200	41 50 04	71 21 53	3 Miles E
	920	WJAR	5,000	0630-0100	41 46 53	71 19 55	6 Miles SE
SOUTH CAROLINA							
Charleston	1250	WTMA	1,000	0600-2400	32 49 20	79 58 45	4 Miles NW
	1390	WCSC	1,000	0600-0005	32 46 48	79 58 02	2 Miles W
Columbia	560	WIS	5,000	0600-0005	33 56 52	81 00 16	4 Miles SSE
Greenville	1330	WFBC	5,000	0600-2400	34 48 26	82 25 40	3 Miles SSW
Spartanburg	950	WSPA	5,000	0600-2400	34 58 49	81 59 13	4 Miles NW
SOUTH DAKOTA							
Aberdeen	1420	KABR	5,000	0700-2400	45 29 04	98 30 40	2 Miles NW
Sioux Falls	1140	KSOO	5,000	0600-LS	43 32 23	96 47 01	3 Miles W
Yankton	570	WNAX	5,000	0630-0005	42 55 24	97 20 06	5 Miles NE
TENNESSEE							
Chattanooga	1150	WAPO	5,000	0530-2305	35 04 14	85 19 53	3 Miles NW
	1310	WDOD	5,000	0600-2305	35 04 50	85 20 00	4 Miles NW
Jackson	1390	WTJS	1,000	0700-2400			
Johnson City	910	WJHL	1,000	0600-2400	36 20 52	82 22 35	2 Miles NNW
Knoxville	620	WROL	1,000	0500-2400	35 59 23	83 50 18	5 Miles ENE
	990	WNOX	10,000	0500-2400	36 02 30	83 53 57	5 Miles NNE
Memphis	600	WREC	5,000	0600-2400	35 11 42	90 00 36	5 Miles N
	790	WMC	5,000	0530-2400	35 10 03	89 52 12	9 Miles ENE
	1460	WMPS	1,000	0630-2400	35 06 20	90 02 40	3 Miles SW
Nashville	650	WSM	50,000	0600-2400	35 59 24	86 47 42	12 Miles S
	980	WSIX	5,000	0600-2400	36 12 57	86 41 45	6 Miles NE
	1510	WLAC	50,000	0600-2400	36 16 30	86 45 40	5 Miles NE
TEXAS							
Amarillo	1440	KGNC	5,000	0630-2300	35 11 27	101 47 43	4 Miles ESE
Beaumont	560	KFDM	1,000	0600-2400	30 04 20	94 05 06	2 Miles SE
Brownwood	1380	KBWD	1,000	0630-2300	31 43 48	98 57 36	2 Miles ENE
College Station	1150	WTAW	1,000	LSR-LS	30 37 42	96 20 40	4 Miles SSE of Bryan
Corpus Christi	1360	KRIS	1,000	0600-2400	27 45 44	97 22 45	3 Miles SE
Dallas	660	KSKY	1,000	0600-LS	32 45 00	96 41 41	6 Miles SE
	820	WFAA	50,000	0600-2400	32 55 09	97 01 40	17 Miles NW
	1080	KRLD	50,000	0600-2400	32 53 12	96 38 36	11 Miles NE
	1310	WRR	5,000	0600-2400	32 51 49	96 43 42	6 Miles NNE
El Paso	600	KROD	1,000	0600-2330			
	1380	KTSM	1,000	0600-2300	31 45 41	106 24 37	3 Miles ESE
Ft. Worth	570	KGKO	5,000	0600-2400	32 42 54	97 04 58	15 Miles ESE
	820	WBAP	50,000	0545-2400	32 55 09	97 01 40	21 Miles NE
	1270	KFJZ	5,000	0600-2400	32 48 48	97 15 33	6 Miles NE
Houston	740	KTRH	50,000	0600-2400	29 46 22	94 53 07	27 Miles E
	950	KPRC	5,000	0600-2400	29 42 37	95 10 30	10 Miles ESE
	1320	KXYZ	5,000	0500-0200	29 42 37	95 10 29	3 Miles NW
Longview	1370	KFRO	1,000	0700-2115			
San Antonio	550	KTSA	5,000	0600-2400	29 25 33	98 25 12	5 Miles E
	1200	WOAI	50,000	0600-2400	29 34 42	98 18 53	15 Miles NE
Sherman	910	KRRV	1,000	0600-2400	33 40 20	96 35 40	3 Miles NNE
Weslaco	1290	KRGV	1,000	0600-2400	26 09 34	97 59 52	1 Mile WNW
Wichita Falls	620	KWFT	5,000	0630-2220	33 55 14	98 32 41	3 Miles NW

LOCATION BY STATES	FREQ. IN KCS	CALL	POWER IN WATTS	HOURS OF OPERATION	LOCATION		
					LAT. NORTH	LONG. WEST	FROM CITY
UTAH							
Ogden	1430	KLO	5,000	0630-2400	41 10 48	112 04 12	7 Miles WSW
Salt Lake City	570	KUTA	5,000	0600-0015	40 49 09	111 55 56	4 Miles N
	1160	KSL	50,000	0600-2400	40 46 46	112 05 56	10 Miles W
	1320	KDYL	5,000	0600-0100	40 40 19	111 55 18	7 Miles S
VERMONT							
Burlington	620	WCAX	1,000	0645-2315	44 31 54	73 13 16	4 Miles N
Rutland	1380	WSYB	1,000	0800-2400	43 35 18	72 59 15	2 Miles SSW
St. Albans	1420	WWSR	1,000	0700-LS	44 50 27	73 05 05	5 Miles SSE of Swanton
Waterbury	550	WDEV	1,000	LSR-LS	44 21 06	72 45 04	11 Miles NW of Montpelier
VIRGINIA							
Harrisonburg	550	WSVA	1,000	0600-1930	38 23 04	78 55 10	17 Miles NNE of Staunton
Norfolk	790	WTAR	5,000	0600-2400	36 50 36	76 12 51	5 Miles E
Richmond	910	WRNL	5,000	0530-0100	37 37 05	77 25 38	6 Miles NNE
	1140	WRVA	50,000	0600-0100	37 24 16	77 18 57	8 Miles SE
	1380	WMBG	5,000	0630-0100	37 34 55	77 29 30	4 Miles NW
Roanoke	960	WDBJ	5,000	0600-0005	37 15 20	79 57 24	1 Mile SSW
WASHINGTON							
Centralia	1470	KELA	1,000	0600-2400	46 41 51	122 57 27	2 Miles S
Pullman	1250	KWSC	5,000	0645-0800	46 43 36	117 09 44	1 Mile E
Seattle	710	KIRO	50,000	1000-2200 Cont. except 2400-0300 Tue.	47 24 00	122 26 00	15 Miles SSW
	770	KXA	1,000	0630-LS	47 36 48	122 20 49	1 Miles NW
	950	KOMO	5,000	0530-2400	47 34 57	122 21 45	2 Miles SW
	1000	KJR	5,000	Cont.	47 34 57	122 21 45	2 Miles SW
	1150	KRSC	1,000	0645-2300	47 34 36	122 19 43	2 Miles S
	1250	KTW	1,000		47 36 06	122 20 12	Center of Seattle
	1300	KOL	5,000	0600-2400	47 35 13	122 20 50	2 Miles SSW
Spokane	590	KHQ	5,000	0600-2330	47 36 54	117 24 18	4 Miles S
	920	KFPY	5,000	0600-0005	47 36 16	117 22 40	5 Miles SSE
	1510	KGA	10,000	0600-2400	47 37 05	117 22 06	4 Miles S
Tacoma	570	KVI	5,000	0530-2300	47 25 18	122 25 42	13 Miles N
	1360	KMO	5,000	0600-2400	47 15 00	122 22 00	5 Miles ENE
Walla Walla	1420	KUJ	1,000		46 04 04	118 24 06	4 Miles W
Yakima	1280	KIT	1,000		46 34 56	120 30 10	2 Miles S
WEST VIRGINIA							
Bluefield	1440	WHIS	1,000	0500-2400	37 16 35	81 15 04	11 Miles SW of Princeton
Charleston	580	WCHS	5,000	0600-0100	38 21 30	81 42 58	4 Miles W
Fairmont	920	WMMN	5,000	0500-2330	39 27 03	80 12 29	12 Miles N of Bridgeport
Huntington	930	WSAZ	1,000	0700-2400	38 24 09	82 29 31	3 Miles WSW
Wheeling	1170	WWVA	50,000	0430-0100	40 06 04	80 52 24	8.5 Miles W
WISCONSIN							
Eau Claire	790	WEAU	5,000	0600-2400	44 49 52	91 27 00	3 Miles ENE
Green Bay	1360	WTAQ	5,000	0700-2230	44 25 51	88 04 51	7 Miles SW
La Crosse	1410	WKBH	1,000	0600-2330	43 46 28	91 13 06	3 Miles SSE
Madison	970	WHA	5,000	0730-LS	43 02 30	89 24 19	3 Miles SSW
	1310	WIBA	5,000	0600-2400	43 01 00	89 25 54	5 Miles SSW
Milwaukee	620	WTMJ	5,000	0600-2400	43 02 05	88 07 49	10 Miles W
	1150	WISN	5,000	0600-0005	42 57 14	87 59 28	7 Miles SSW
Sheboygan	1330	WHBL	1,000	0615-2300	43 43 03	87 44 30	3 Miles SSW
Stevens Point	930	WLBL	5,000	LSR-LS	44 36 43	90 01 54	18 Miles NW of Wisconsin Rapids
WYOMING							
Casper	1470	KDFN	1,000	0730-1315 1445-2130	42 51 25	106 18 05	1 Mile NE

BROADCASTING STATIONS IN U. S. AND CANADA

ENTERTAINMENT BAND BY FREQUENCIES *(Canadian Stations Shown in Italics)*

CALL		WATTS
540 KCS		
CBY	*Watrous, Sask.*	*50,000*
550 KCS		
KFYR	Bismarck, N. D.	5,000
WGR	Buffalo, N. Y.	5,000
WKRC	Cincinnati, Ohio	5,000
KOAC	Corvallis, Ore.	5,000
WSVA	Harrisonburg, Va.	1,000
KOY	Phoenix, Ariz.	1,000
KSD	St. Louis, Mo.	5,000
KTSA	San Antonio, Tex.	5,000
WDEV	Waterbury, Vt.	1,000
CFNB	*Fredricton, N. B.*	*1,000*
560 KCS		
KFDM	Beaumont, Texas	1,000
WIS	Columbia, S. C.	5,000
KLZ	Denver, Colo.	5,000
WIND	Gary, Ind.	5,000
WQAM	Miami, Fla.	1,000
WFIL	Philadelphia, Pa.	1,000
WGAN	Portland, Me.	5,000
KSFO	San Francisco, Calif.	5,000
KWTO	Springfield, Mo.	5,000
CJKL	*Kirkland Lake, Ont.*	*1,000*
570 KCS		
WWNC	Asheville, N. C.	1,000
KGKO	Fort Worth, Texas	5,000
KMTR	Los Angeles, Calif.	1,000
WMCA	New York, N. Y.	5,000
KUTA	Salt Lake City, Utah	5,000
WSYR	Syracuse, N. Y.	5,000
KVI	Tacoma, Wash.	5,000
WNAX	Yankton, S. D.	5,000
WKBN	Youngstown, Ohio	5,000
580 KCS		
WCHS	Charleston, W. Va.	5,000
KMJ	Fresno, Calif.	5,000
KSAC	Manhattan, Kansas	1,000
WDBO	Orlando, Fla.	5,000
WIBW	Topeka, Kansas	5,000
WILL	Urbana, Illinois	5,000
WTAG	Worcester, Mass.	5,000
CKUA	*Edmonton, Alberta*	*500*
CKPR	*Fort William, Ont.*	*1,000*
CKCL	*Toronto, Ontario*	*1,000*
590 KCS		
WAGA	Atlanta, Ga.	5,000
WEEI	Boston, Mass.	5,000
WKZO	Kalamazoo, Mich.	5,000
WOW	Omaha, Neb.	5,000
KHQ	Spokane, Wash.	5,000
WMBS	Uniontown, Pa.	1,000
600 KCS		
WCAO	Baltimore, Md.	5,000
WICC	Bridgeport, Conn.	1,000
WMT	Cedar Rapids, Iowa	5,000
KROD	El Paso, Texas	1,000
WREC	Memphis, Tenn.	5,000
KFSD	San Diego, Calif.	1,000
WSJS	Winston-Salem, N. C.	5,000
CFCF	*Montreal, Que.*	*500*
CFQC	*Saskatoon, Sask.*	*1,000*
CJOR	*Vancouver, B. C.*	*1,000*
610 KCS		
WSGN	Birmingham, Ala.	5,000
WAYS	Charlotte, N. C.	1,000
KDAL	Duluth, Minn.	1,000
WDAF	Kansas City, Mo.	5,000
610 KCS (Cont.)		
WMUR	Manchester, N. H.	5,000
WIOD	Miami, Fla.	5,000
WIP	Philadelphia, Pa.	5,000
KFRC	San Francisco, Calif.	5,000
CHNC	*New Carlisle, Que.*	*1,000*
CJAT	*Trail, B. C.*	*1,000*
620 KCS		
WLBZ	Bangor, Me.	5,000
WCAX	Burlington, Vt.	1,000
WROL	Knoxville, Tenn.	1,000
WTMJ	Milwaukee, Wisc.	5,000
KTAR	Phoenix, Ariz.	5,000
KGW	Portland, Ore.	5,000
WSUN	St. Petersburg, Fla.	5,000
WAGE	Syracuse, N. Y.	1,000
WKAQ	San Juan, P. R.	
KWFT	Wichita Falls, Tex.	5,000
CKCK	*Regina, Sask.*	*1,000*
630 KCS		
KVOD	Denver, Colo.	5,000
WPRO	Providence, R. I.	5,000
KOH	Reno, Nevada	1,000
KXOK	St. Louis, Mo.	5,000
WMAL	Washington, D. C.	5,000
CFCY	*Charlottetown, P. E. I.*	*1,000*
CFCO	*Chatham, Ontario*	*100*
CKOV	*Kelowna, B. C.*	*1,000*
CJRC	*Winnepeg, Man.*	*1,000*
640 KCS		
WOI	Ames, Iowa	5,000
KFI	Los Angeles, Calif.	50,000
WNAD	Norman, Okla.	1,000
650 KCS		
WSM	Nashville, Tenn.	50,000
660 KCS		
KSKY	Dallas, Texas	1,000
WEAF	New York, N. Y.	50,000
670 KCS		
WMAQ	Chicago, Ill.	50,000
680 KCS		
WLAW	Lawrence, Mass.	5,000
WPTF	Raleigh, N. C.	50,000
KFEQ	St. Joseph, Mo.	5,000
KPO	San Francisco, Calif.	50,000
690 KCS		
KGGF	Coffeyville, Kans.	1,000
CBF	*Montreal, Que.*	*50,000*
700 KCS		
WLW	Cincinnati, Ohio	50,000
710 KCS		
KMPC	Beverly Hills, Calif.	10,000
WFTL	Ft. Lauderdale, Fla.	10,000
WOR	New York, N. Y.	50,000
KIRO	Seattle, Wash.	50,000
720 KCS		
WGN	Chicago, Ill.	50,000
730 KCS		
CKAC	*Montreal, Que.*	*5,000*
740 KCS		
KTRH	Houston, Texas	50,000
KQW	San Jose, Calif.	5,000
CBL	*Toronto, Ontario*	*50,000*
750 KCS		
WSB	Atlanta, Ga.	50,000
KMMJ	Grand Island, Neb.	1,000
KXL	Portland, Ore.	10,000
WHEB	Portsmouth, N. H.	1,000
760 KCS		
KGU	Honolulu, T. H.	
WJR	Detroit, Mich.	50,000
770 KCS		
WLB	Minneapolis, Minn.	5,000
WJZ	New York, N. Y.	50,000
WCAL	Northfield, Minn.	5,000
WEW	St. Louis, Mo.	1,000
KXA	Seattle, Wash.	1,000
780 KCS		
WBBM	Chicago, Ill.	50,000
KFAB	Lincoln, Neb.	10,000
790 KCS		
KFQD	Anchorage, Alaska	
WEAU	Eau Claire, Wisc.	5,000
KGHL	Billings, Mont.	5,000
KECA	Los Angeles, Calif.	5,000
WPRA	Mayaguez, P. R.	
WMC	Memphis, Tenn.	5,000
WTAR	Norfolk, Va.	5,000
WEAN	Providence, R. I.	5,000
WPIC	Sharon, Pa.	1,000
WWNY	Watertown, N. Y.	1,000
CKSO	*Sudbury, Ontario*	*1,000*
800 KCS		
CKLW	*Windsor, Ontario*	*5,000*
810 KCS		
KOAM	Pittsburg, Kansas	1,000
KGO	San Francisco, Calif.	7,500
WGY	Schenectady, N. Y.	50,000
820 KCS		
WAIT	Chicago, Ill.	5,000
WOSU	Columbus, Ohio	5,000
WFAA	Dallas, Texas	50,000
WBAP	Fort Worth, Texas	
830 KCS		
WCCO	Minneapolis, Minn.	50,000
WNYC	New York, N. Y.	1,000
840 KCS		
WHAS	Louisville, Ky.	50,000
850 KCS		
WHDH	Boston, Mass.	5,000
KFUO	Clayton, Mo.	5,000
KOA	Denver, Colo.	50,000
WRUF	Gainesville, Fla.	5,000
WEEU	Reading, Pa.	1,000
860 KCS		
KTRB	Modesto, Calif.	1,000
CFRB	*Toronto, Ontario*	*10,000*

BROADCASTING STATIONS IN U. S. AND CANADA

ENTERTAINMENT BAND BY FREQUENCIES *(Canadian Stations Shown in Italics)*

CALL		WATTS
870 KCS		
WKAR	E. Lansing, Mich.	5,000
WHCU	Ithaca, N. Y.	1,000
WWL	New Orleans, La.	50,000
880 KCS		
WHB	Kansas City, Mo.	1,000
WABC	New York, N. Y.	50,000
890 KCS		
WLS WENR	Chicago, Illinois	50,000
900 KCS		
KLCN	Blytheville, Ark.	1,000
WSBA	York, Pa.	1,000
CHML	*Hamilton, Ontario*	*1,000*
CKBI	*Prince Albert, Sask.*	*1,000*
CJBR	*Rimouski, Que.*	*1,000*
910 KCS		
WABI	Bangor, Me.	5,000
KPOF	Denver, Colo.	1,000
WFDF	Flint, Mich.	1,000
KFKA	Greeley, Colo.	1,000
WSUI	Iowa City, Iowa	5,000
WJHL	Johnson City, Tenn.	1,000
WCOC	Meridian, Miss.	1,000
KLX	Oakland, Calif.	1,000
WRNL	Richmond, Va.	5,000
WGBI	Scranton, Pa.	1,000
KRRV	Sherman, Texas	1,000
CBO	*Ottawa, Ontario*	*1,000*
CFJC	*Kamloops, B. C.*	*1,000*
920 KCS		
WGST	Atlanta, Ga.	5,000
WBBB	Burlington, N. C.	1,000
WMMN	Fairmont, W. Va.	5,000
KFXJ	Grand Junction, Colo.	1,000
WBAA	West LaFayette, Ind.	5,000
KARK	Little Rock, Ark.	5,000
WJAR	Providence, R. I.	5,000
KFNF	Shenandoah, Iowa	1,000
KFPY	Spokane, Wash.	5,000
WTTM	Trenton, N. J.	1,000
930 KCS		
WBEN	Buffalo, N. Y.	5,000
WSAZ	Huntington, W. Va.	1,000
WJAX	Jacksonville, Fla.	5,000
KGBU	Ketchikan, Alaska	
KHJ	Los Angeles, Calif.	5,000
WKY	Oklahoma City, Okla.	5,000
WPAT	Patterson, N. J.	1,000
KSEI	Pocatello, Idaho	1,000
WTAD	Quincy, Ill.	1,000
WLBL	Stevens Point, Wisc.	5,000
WRRF	Washington, N. C.	1,000
CJCA	*Edmonton, Alberta*	*1,000*
940 KCS		
WMAZ	Macon, Ga.	5,000
KTKC	Visalia, Calif.	5,000
CBM	*Montreal Quebec*	*5,000*
950 KCS		
WORL	Boston, Mass.	1,000
KFEL	Denver, Colo.	5,000
WWJ	Detroit, Mich.	5,000
KPRC	Houston, Texas	5,000
WPEN	Philadelphia, Pa.	5,000
KOMO	Seattle, Wash.	5,000
WSPA	Spartanburg, S. C.	5,000
WAAF	Chicago, Illinois	1,000

CALL		WATTS
960 KCS		
WBRC	Birmingham, Ala.	5,000
WELI	New Haven, Conn.	1,000
KROW	Oakland, Calif.	1,000
WDBJ	Roanoke, Va.	5,000
KMA	Shenandoah, Iowa	5,000
WSBT	South Bend, Ind.	1,000
CFAC	*Calgary, Alberta*	*1,000*
CHNS	*Halifax, N. S.*	*1,000*
970 KCS		
WICA	Ashtabula, Ohio	1,000
WDAY	Fargo, N. D.	5,000
WAAT	Newark, N. J.	1,000
WAVE	Louisville, Ky.	5,000
WHA	Madison, Wisc.	5,000
WCSH	Portland, Me.	5,000
KOIN	Portland, Ore.	5,000
WFLA	Tampa, Fla.	5,000
980 KCS		
WGBG	Greensboro, N. C.	1,000
KMBC	Kansas City, Mo.	5,000
KFWB	Los Angeles, Calif.	5,000
WSIX	Nashville, Tenn.	5,000
WTRY	Troy, N. Y.	1,000
WRC	Washington, D. C.	5,000
CBV	*Quebec, Que.*	*1,000*
CJRM	*Regina, Sask.*	*1,000*
CKWX	*Vancouver, B. C.*	*1,000*
990 KCS		
WNOX	Knoxville, Tenn.	10,000
WIBG	Philadelphia, Pa.	10,000
CKY	*Winnepeg, Man.*	*15,000*
1000 KCS		
WCFL	Chicago, Illinois	10,000
WINS	New York, N. Y.	1,000
KJR	Seattle, Wash.	5,000
1010 KCS		
CFCN	*Calgary, Alberta*	*10,000*
KLRA	Little Rock, Ark.	10,000
CBY	*Toronto, Ontario*	*1,000*
1020 KCS		
KFVD	Los Angeles, Calif.	1,000
KDKA	Pittsburgh, Pa.	50,000
1030 KCS		
KOB	Albuquerque, N. M.	10,000
WBZ	Boston, Mass.	50,000
WBZA	Springfield, Mass.	1,000
1040 KCS		
WHO	Des Moines, Iowa	50,000
1050 KCS		
WHN	New York, N. Y.	50,000
WDZ	Tuscola, Ill.	1,000
1060 KCS		
KYW	Philadelphia, Pa.	50,000
1070 KCS		
WAPI	Birmingham, Ala.	5,000
WIBC	Indianapolis, Ind.	5,000
KNX	Los Angeles, Calif.	50,000
KFBI	Wichita, Kans	5,000
CBA	*Sackville, N. B.*	*50,000*

CALL		WATTS
1080 KCS		
KRLD	Dallas, Texas	50,000
WTIC	Hartford, Conn.	50,000
KWJJ	Portland, Ore.	1,000
1090 KCS		
WBAL	Baltimore, Md.	50,000
KTHS	Hot Springs, Ark.	5,000
WJAG	Norfolk, Neb.	1,000
1100 KCS		
WTAM	Cleveland, Ohio	50,000
1110 KCS		
WBT	Charlotte, N. C.	50,000
WMBI	Chicago, Ill.	5,000
KPAS	Pasadena, Calif.	10,000
1120 KCS		
KMOX	St. Louis, Mo.	50,000
1130 KCS		
WDGY	Minneapolis, Minn.	5,000
WNEW	New York, N. Y.	10,000
WCAR	Pontiac, Mich.	1,000
KWKH	Shreveport, La.	50,000
CBR	*Vancouver, B. C.*	*5,000*
1140 KCS		
WRVA	Richmond, Va.	50,000
KSOO	Sioux Falls, S. D.	5,000
KGDM	Stockton, Calif.	5,000
1150 KCS		
WJBO	Baton Rouge, La.	5,000
WAPO	Chattanooga, Tenn.	5,000
WTAW	College Station, Texas	1,000
KFSG	Los Angeles, Calif.	2,500
KRKD	Los Angeles, Calif.	2,500
WISN	Milwaukee, Wisc.	5,000
KSAL	Salina, Kans.	1,000
KRSC	Seattle, Wash.	1,000
WDEL	Wilmington, Dela.	5,000
CKX	*Brandon, Manitoba*	*1,000*
CKOC	*Hamilton, Ontario*	*1,000*
CHSJ	*Saint John, N. B.*	*1,000*
1160 KCS		
WJJD	Chicago, Ill.	20,000
KSL	Salt Lake City, Utah	50,000
1170 KCS		
KVOO	Tulsa, Okla.	50,000
WWVA	Wheeling, W. Va.	50,000
1180 KCS		
WHAM	Rochester, N. Y.	50,000
1190 KCS		
WLIB	Brooklyn, N. Y.	1,000
WOWO	Fort Wayne, Ind.	10,000
KEX	Portland, Ore.	5,000
1200 KCS		
WOAI	San Antonio, Texas	50,000
1210 KCS		
WCAU	Philadelphia, Pa.	50,000
1220 KCS		
WGNY	Newburgh, N. Y.	1,000
CHAB	*Moose Jaw, Sask.*	*1,000*

BROADCASTING STATIONS IN U. S. AND CANADA

ENTERTAINMENT BAND BY FREQUENCIES *(Canadian Stations Shown In Italics)*

CALL		WATTS
1230 KCS		
Low Powered Stations only.		
1240 KCS		
1250 KCS		
WTMA	Charleston, S. C.	1,000
KFKU	Lawrence, Kans.	5,000
WREN	Lawrence, Kans.	5,000
WCAE	Pittsburgh, Pa.	5,000
KWSC	Pullman, Wash.	5,000
KTMS	Santa Barbara, Calif.	1,000
KTW	Seattle, Wash.	1,000
WDAE	Tampa, Fla.	5,000
1260 KCS		
KGGM	Albuquerque, N. M.	1,000
WNAC	Boston, Mass.	5,000
WFBM	Indianapolis, Ind.	5,000
KYA	San Francisco, Calif.	5,000
KGBX	Springfield, Mo.	5,000
WOL	Washington, D. C.	1,000
CFRN	*Edmonton, Alberta*	*1,000*
1270 KCS		
WXYZ	Detroit, Mich.	5,000
KFJZ	Fort Worth, Texas	5,000
WPDQ	Jacksonville, Fla.	5,000
WHBF	Rock Island, Ill.	5,000
KTFI	Twin Falls, Idaho	1,000
CJSB	*Sidney, N. S.*	*1,000*
1280 KCS		
WGBF	Evansville, Ind.	5,000
KFOX	Long Beach, Calif.	1,000
WTCN	Minneapolis, Minn.	5,000
WHBI	Newark, N. J.	2,500
WKST	Newcastle, Pa.	1,000
WDSU	New Orleans, La.	1,000
WOV	New York, N. Y.	5,000
KIT	Yakima, Wash.	1,000
1290 KCS		
WNBF	Binghamton, N. Y.	5,000
KHSL	Chico, Calif.	1,000
WHIO	Dayton, Ohio	5,000
WHKY	Hickory, N. C.	5,000
WKNE	Keene, N. H.	5,000
KGVO	Missoula, Mont.	5,000
WHLD	Niagara Falls, N. Y.	1,000
KOIL	Omaha, Neb.	5,000
WTOC	Savannah, Ga.	5,000
KUOA	Siloam Springs, Ark.	5,000
KVOA	Tucson, Ariz.	1,000
KRGV	Weslaco, Texas	1,000
1300 KCS		
WFBR	Baltimore, Md.	5,000
KVOR	Colorado Springs, Colo.	1,000
WOOD	Grand Rapids, Mich.	5,000
WJDX	Jackson, Miss.	5,000
KGLO	Mason City, Iowa	5,000
KOL	Seattle, Wash.	5,000
1310 KCS		
WDOD	Chattanooga, Tenn.	5,000
WRR	Dallas, Texas	5,000
KFBB	Great Falls, Mont.	5,000
WISH	Indianapolis, Ind.	5,000
WIBA	Madison, Wisc.	5,000
KLS	Oakland, Calif.	1,000
WORC	Worcester, Mass.	1,000

CALL		WATTS
1320 KCS		
WEBC	Duluth, Minn.	5,000
KXYZ	Houston, Texas	5,000
WJAS	Pittsburgh, Pa.	5,000
KDYL	Salt Lake City, Utah	5,000
WNEL	San Juan, P. R.	
WATR	Waterbury, Conn.	1,000
1330 KCS		
WFIN	Findlay, Ohio	1,000
WFBC	Greenville, S. C.	5,000
KFAC	Los Angeles, Calif.	1,000
WLOL	Minneapolis, Minn.	1,000
WEVD	New York, N. Y.	5,000
KALE	Portland, Ore.	5,000
WHBL	Sheboygan, Wisc.	1,000
KFH	Wichita, Kans.	5,000
1340 KCS		
Low Powered Stations only.		
1350 KCS		
WADC	Tallmadge, Ohio	5,000
KRNT	Des Moines, Iowa	5,000
KID	Idaho Falls, Idaho	5,000
WSMB	New Orleans, La.	5,000
KSRO	Santa Rosa, Calif.	1,000
WORK	York, Pa.	1,000
1360 KCS		
WSAI	Cincinnati, Ohio	5,000
KRIS	Corpus Christi, Texas	1,000
WTAQ	Green Bay, Wisc.	5,000
WDRC	Hartford, Conn.	5,000
WKAT	Miami Beach, Fla.	1,000
KGB	San Diego, Calif	1,000
KSCJ	Sioux City, Iowa	5,000
KMO	Tacoma, Wash.	5,000
1370 KCS		
KGIR	Butte, Mont.	5,000
KGNO	Dodge City, Kans.	1,000
KDTH	Dubuque, Iowa	1,000
KFRO	Longview, Texas	1,000
WFEA	Manchester, N. H.	5,000
WCOA	Pensacola, Fla.	1,000
WPAB	Ponce, P. R.	
WSPD	Toledo, Ohio	5,000
1380 KCS		
KIDO	Boise, Idaho	2,500
KBWD	Brownwood, Texas	1,000
KTSM	El Paso, Texas	1,000
WBNX	New York, N. Y.	5,000
WMBG	Richmond, Va.	5,000
WSYB	Rutland, Vt.	1,000
KWK	St. Louis, Mo.	5,000
WTSP	St. Petersburg, Fla.	1,000
WAWZ	Zarapath, N. J.	5,000
1390 KCS		
WCSC	Charleston, S. C.	1,000
WGES	Chicago, Ill.	5,000
KCRC	Enid, Okla.	1,000
WTJS	Jackson, Tenn.	1,000
KGER	Long Beach, Calif.	5,000
KLPM	Minot, N. D.	1,000
KSLM	Salem, Ore.	1,000
WFBL	Syracuse, N. Y.	5,000
WQBC	Vicksburg, Miss.	1,000
1410 KCS		
KERN	Bakersfield, Calif.	1,000
WEGO	Concord, N. C.	1,000
WING	Dayton, Ohio	5,000

CALL		WATTS
1410 KCS (Cont.)		
WKBH	La Crosse, Wisc.	1,000
WALA	Mobile, Ala.	5,000
WNBC	Hartford, Conn.	5,000
KQV	Pittsburgh, Pa.	1,000
1420 KCS		
KABR	Aberdeen, S. D.	5,000
WHK	Cleveland, Ohio	5,000
WOC	Davenport, Iowa	5,000
WFCI	Pawtucket, R. I.	1,000
WWSR	St. Albans, Vt.	1,000
KUJ	Walla Walla, Wash.	1,000
1430 KCS		
WBYN	Brooklyn, N. Y.	1,000
KARM	Fresno, Calif.	5,000
WIRE	Indianapolis, Ind.	5,000
KLO	Ogden, Utah	5,000
KWKW	Pasadena, Calif.	1,000
KTUL	Tulsa, Okla.	5,000
1440 KCS		
KGNC	Amarillo, Texas	5,000
WBCM	Bay City, Mich.	1,000
WHIS	Bluefield, W. Va.	1,000
WAAB	Worcester, Mass.	5,000
KFJM, KILO	Grand Forks, N. D.	1,000
KMED	Medford, Ore.	1,000
WSFA	Montgomery, Ala.	1,000
KPRO	Riverside, Calif.	1,000
WROK	Rockford, Ill.	1,000
1450 KCS		
Low Powered Stations only.		
1460 KCS		
WOKO	Albany, N. Y.	1,000
WBNS	Columbus, Ohio	5,000
KSO	Des Moines, Iowa	5,000
WHP	Harrisburg, Pa.	5,000
KINY	Juneau, Alaska	
WMPS	Memphis, Tenn.	1,000
KGNF	North Platte, Neb.	1,000
WHEC	Rochester, N. Y.	1,000
CJGX	*Yorkton, Sask.*	*1,000*
1470 KCS		
KDFN	Casper, Wyo.	1,000
KELA	Centralia, Wash.	1,000
WBIG	Greensboro, N. C.	5,000
WMBD	Peoria, Ill.	5,000
CKBG	*Timmins, Ontario*	*1,000*
1480 KCS		
WRDW	Augusta, Ga.	5,000
WGAR	Cleveland, Ohio	5,000
KIEM	Eureka, Calif.	1,000
WSAR	Fall River, Mass.	1,000
WHOM	Jersey City, N. J.	1,000
KCMO	Kansas City, Mo.	5,000
KCCX	Sidney, Mont.	1,000
KTBS	Shreveport, La.	1,000
CFCT	*Victoria, B. C.*	*500*
1490 KCS		
Low Powered Stations only.		
1500 KCS		
KSTP	St. Paul, Minn.	50,000
WTOP	Washington, D. C.	50,000

BROADCASTING STATIONS IN U. S. AND CANADA

ENTERTAINMENT BAND BY FREQUENCIES *(Canadian Stations Shown In Italics)*

CALL		WATTS
1510 KCS		
WMEX	Boston, Mass.	5,000
WLAC	Nashville, Tenn.	50,000
KGA	Spokane, Wash.	10,000
1520 KCS		
WKBW	Buffalo, N. Y.	50,000
KOMA	Oklahoma City, Okla.	5,000
WPRP	Ponce, P. R.	
1530 KCS		
WCKY	Cincinnati, Ohio	50,000
KFBK	Sacramento, Calif.	10,000
1540 KCS		
KXEL	Waterloo, Iowa	50,000
1560 KCS		
KPMC	Bakersfield, Calif.	1,000
WQXR	New York, N. Y.	10,000
1570 KCS		
CFPL	*London, Ontario*	*1,000*
1590 KCS		
WAKR	Akron, Ohio	5,000
WALB	Albany, Ga.	1,000
WBRY	Waterbury, Conn.	1,000
1600 KCS		

STANDARD TIME SIGNALS

U. S. Naval Observatory time signals are broadcast by naval radio stations at the time and frequency indicated in the tabulation below.

All signals are made in the following manner:

The signals begin at 5 minutes before the hour and consist of a dash on each second, except that no dashes are sent on the seconds listed below:

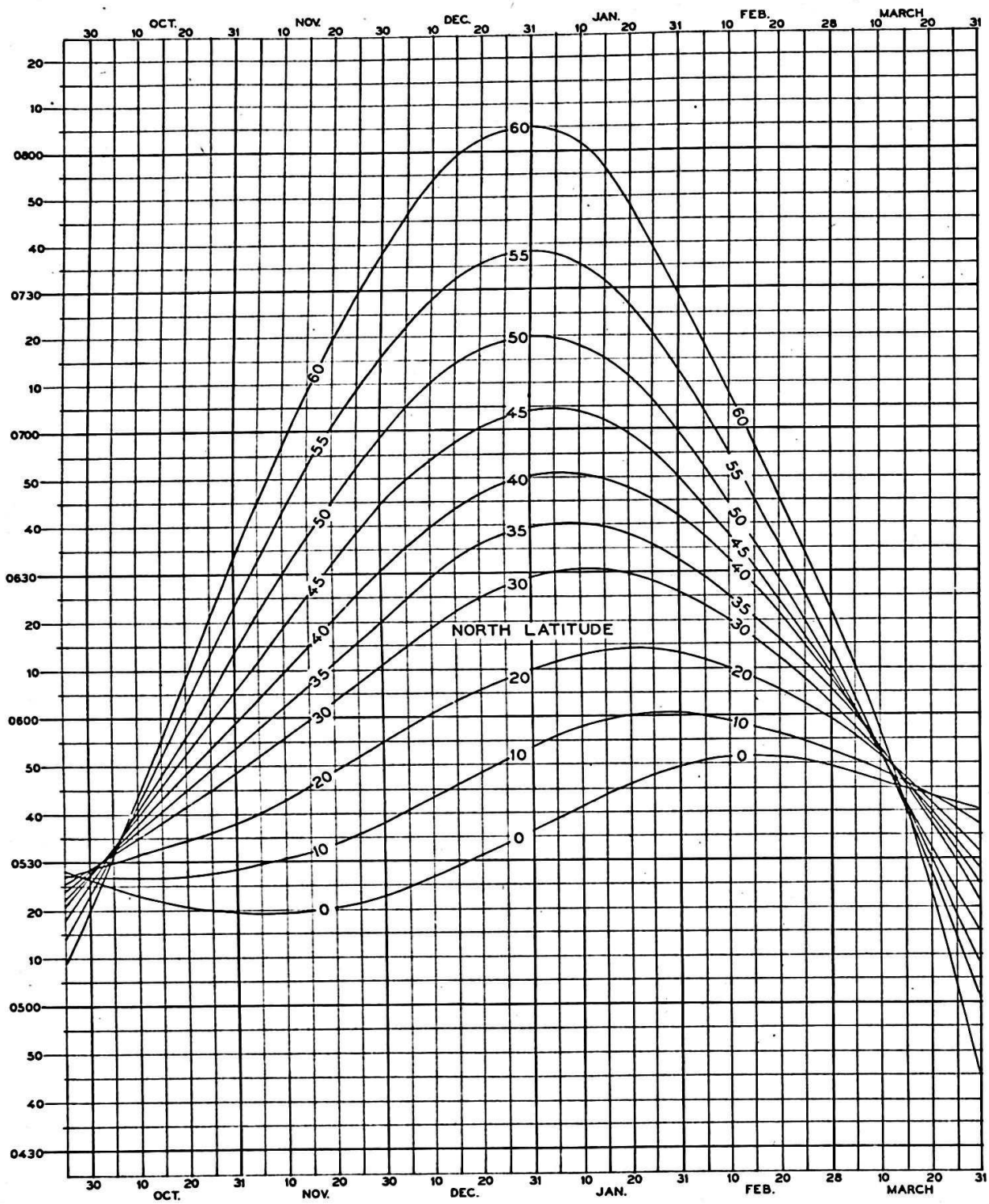
55 minutes: 29, 51, and 56 to 59 seconds.
56 minutes: 29, 52, and 56 to 59 seconds.
57 minutes: 29, 53, and 56 to 59 seconds.
58 minutes: 29, 54, and 56 to 59 seconds.
59 minutes: 29, and 51 to 59 seconds.

Beginning exactly on the hour a much longer dash is sent. The exact second is denoted by the beginning of the dash, the end of the dash being of no significance. It will be noted that the number of seconds sounded immediately following the single second omission and preceding the long pause at the end of each minute indicates the number of minutes of the signal yet to be sent.

Station NSS automatically transmits the signal as received from the Naval Observatory at Washington, with errors averaging only 0.02 second. The other stations reradiate, and the error may be somewhat larger.

The following schedule gives the hours of the ending of the U. S. Naval Observatory time signal transmissions. The first column gives Greenwich Mean Time (GMT). The second column the corresponding Eastern Standard Time (EST). In the station columns are listed the transmitting frequencies used by the stations.

GMT	EST	STATION WWV WASHINGTON, D.C.	STATION NSS ANNAPOLIS, MD.	STATION NPG MARE ISLAND, CAL.	STATION NPM PEARL HARBOR, T.H.	STATION NBA BALBOA, C.Z.
0	1900	2500-5000-10000		115		
1	2000	2500-5000-10000				
2	2100	2500-5000-10000				
3	2200	2500-5000-10000		115-9255-12540		
4	2300	2500-5000-10000	122-4390-9425-12630		16.68-9090-14390-17370	
5	0000	2500-5000-10000				148-5515-11080
6	0100	2500-5000-10000				
7	0200	2500-5000-10000				
8	0300	2500-5000-10000		115-9255-12540		
9	0400	2500-5000-10000				
10	0500	2500-5000-10000	122-4390-9425-12630			
11	0600	2500-5000-10000-15000				
12	0700	2500-5000-10000-15000				
13	0800	5000-10000-15000				
14	0900	5000-10000-15000				
15	1000	5000-10000-15000		115-9255-12540		
16	1100	5000-10000-15000	122-4390-9425-12630		16.68-4525-9090-6380-14390	
17	1200	5000-10000-15000		115		148-2170-5515-11080
18	1300	5000-10000-15000				
19	1400	5000-10000-15000				
20	1500	5000-10000-15000		115	16.68-4525-6380-14390-17370	
21	1600	5000-10000-15000				
22	1700	5000-10000-15000	122-4390-9425-12630			
23	1800	2500-5000-15000				



DAYLIGHT

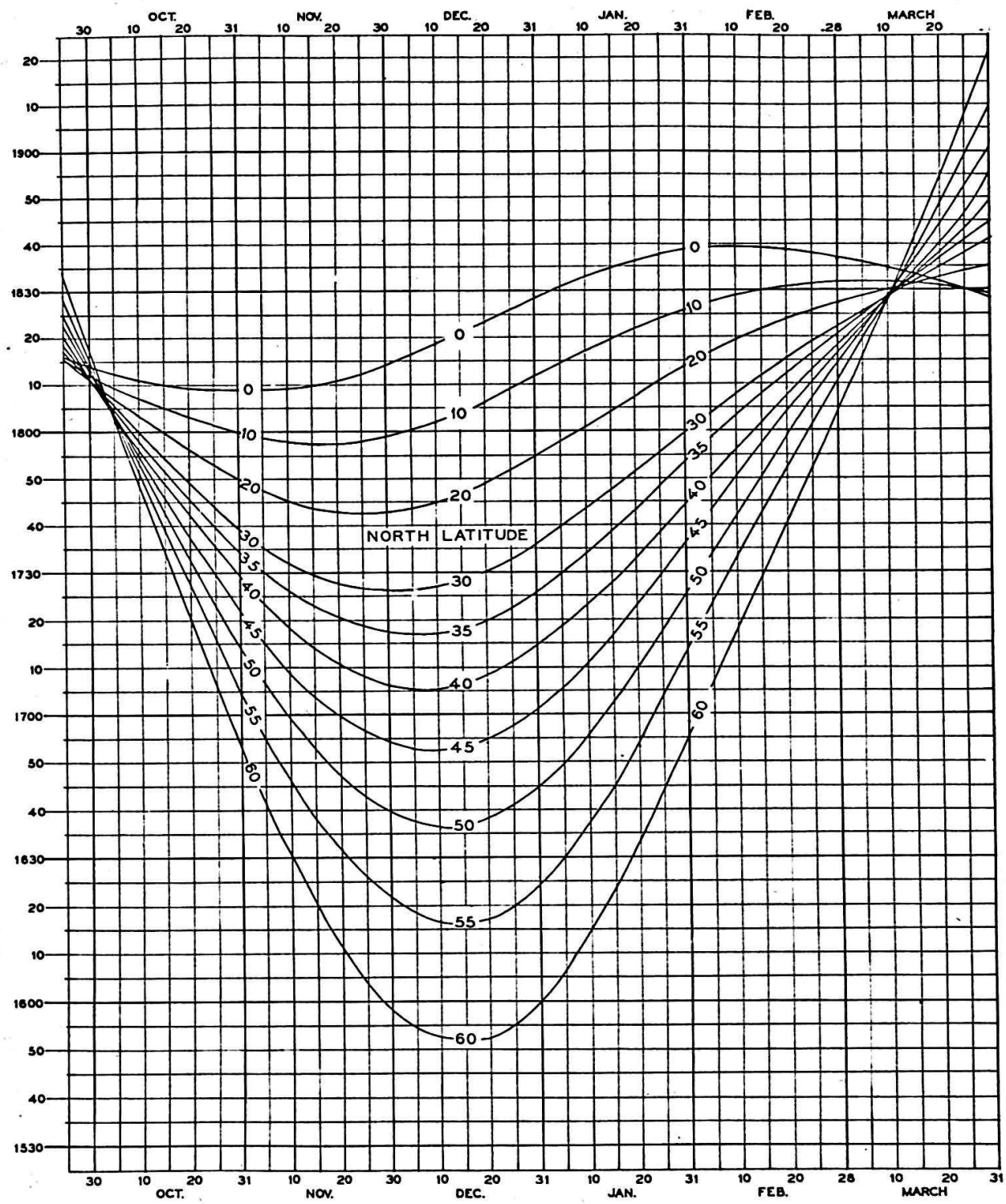
NORTHERN HEMISPHERE

Beginning of Civil Twilight

Civil Twilight begins when the sun is 6° below the horizon.

INSTRUCTIONS

1. Start at top or bottom scale with proper date and move vertically up or down to the curve for the observer's latitude.
2. From the intersection move horizontally to the left and read local civil time.
3. To find exact zone or standard time, *add* 4 minutes for each degree west, or *subtract* 4 minutes for each degree east of the standard meridian.
4. To convert standard time to war time, add one (1) hour.



The standard meridians in the United States are: EST — 75°W; CST — 90°W; MST — 105°W; PST — 120°W.

EXAMPLE

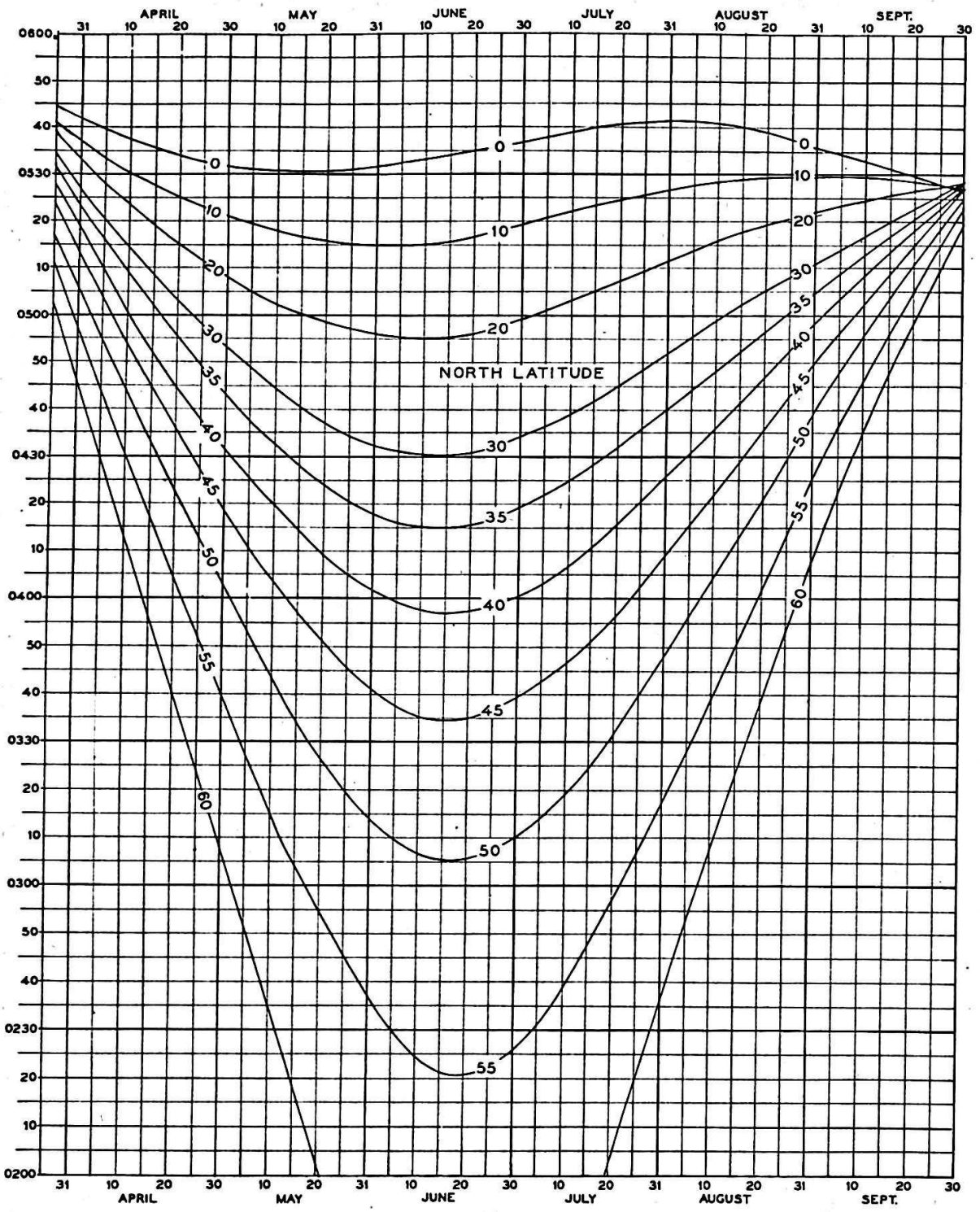
To determine the beginning of Civil Twilight at Patterson Field (Lat. 40°N., Long. 84°W.) on 25 Dec., follow the date line vertically to its intersection with the 40°N. Latitude curve. From this point go to the left and read 0648. 84° being 9° west of the standard meridian (75°W.), add 36 minutes to 0648. Result: 0724 EST.

DARKNESS

NORTHERN HEMISPHERE

End of Civil Twilight

Civil Twilight ends when the sun is 6° below the horizon.



DAYLIGHT

NORTHERN HEMISPHERE

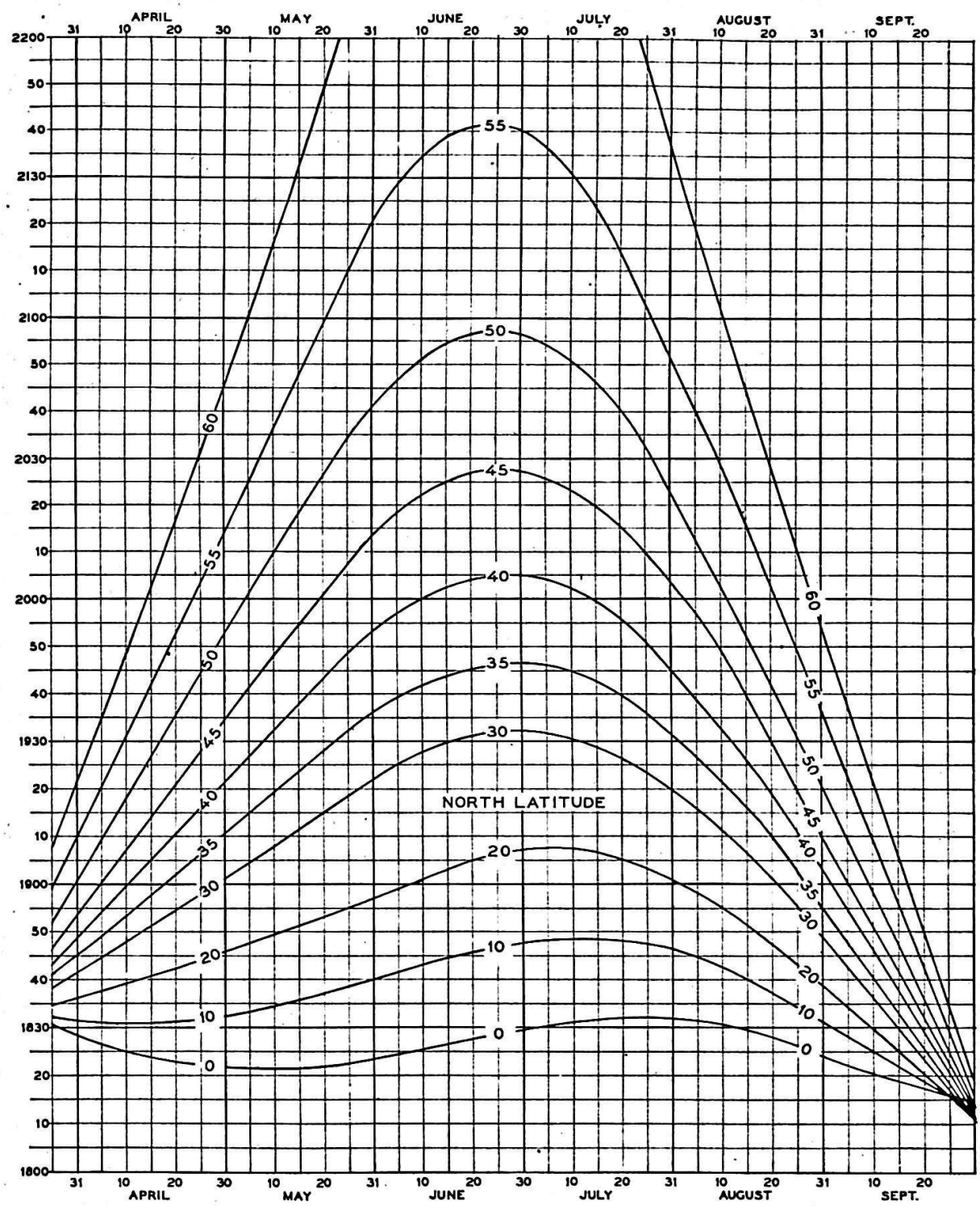
Beginning of Civil Twilight

Civil Twilight begins when the sun is 6° below the horizon.

The standard meridians in the United States are: EST — 75°W; CST — 90°W; MST — 105°W; PST — 120°W.

EXAMPLE

To determine the beginning of Civil Twilight at Patterson Field (Lat. 40°N., Long. 84°W.) on 25 Dec., follow the date line vertically to its intersection with the 40°N. Latitude curve. From this point go to the left and read 0648. 84° being 9° west of the standard meridian (75°W.), add 36 minutes to 0648. Result: 0724 EST.



INSTRUCTIONS

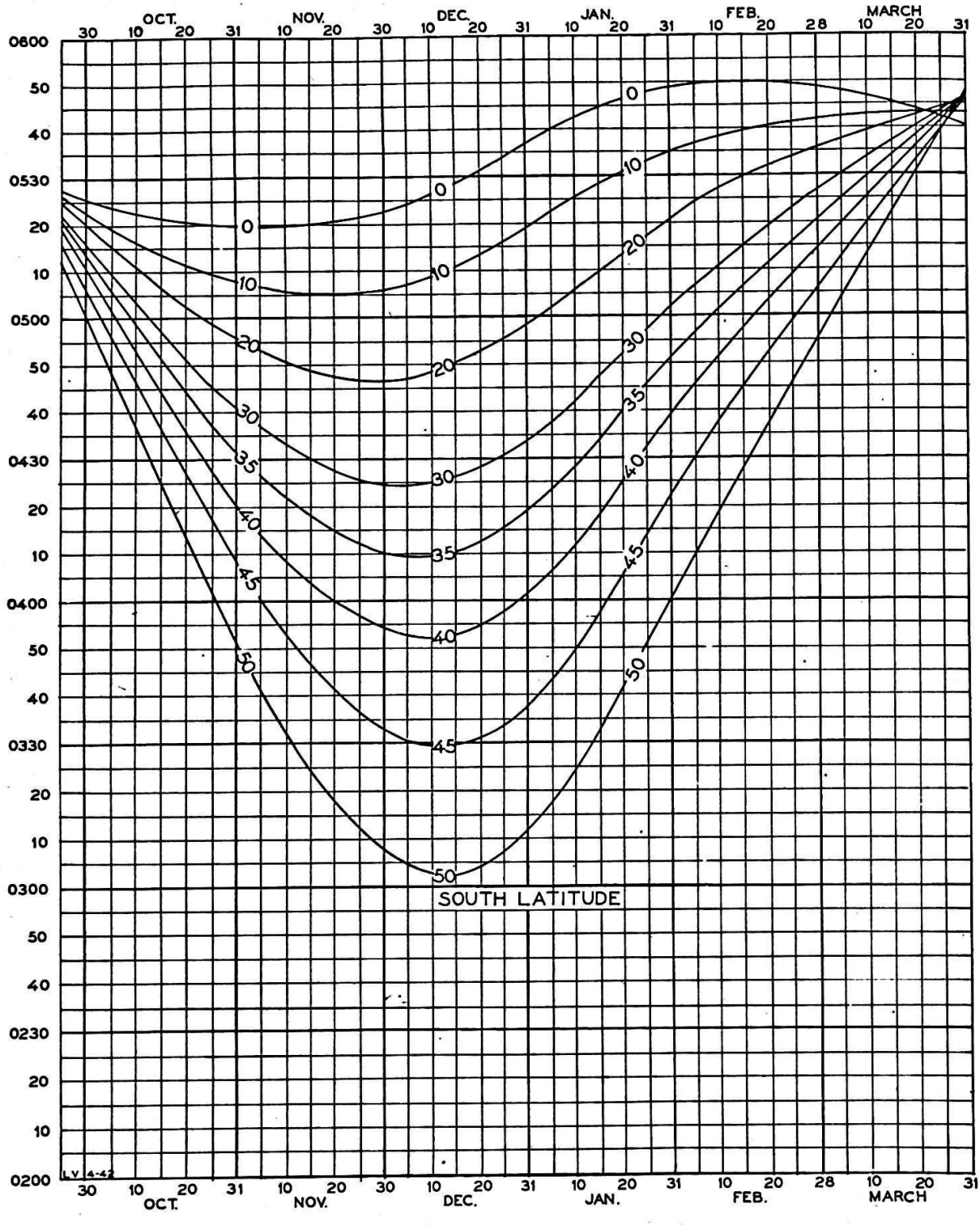
1. Start at top or bottom scale with proper date and move vertically, up or down, to the curve for the observer's latitude.
2. From the intersection move horizontally to the left and read local civil time.
3. To find exact zone or standard time, *add* 4 minutes for each degree west, or *subtract* 4 minutes for each degree east, of the standard meridian.
4. To convert standard time to war time add one (1) hour.

DARKNESS

NORTHERN HEMISPHERE

End of Civil Twilight

Civil Twilight ends when the sun is 6° below the horizon.



DAYLIGHT

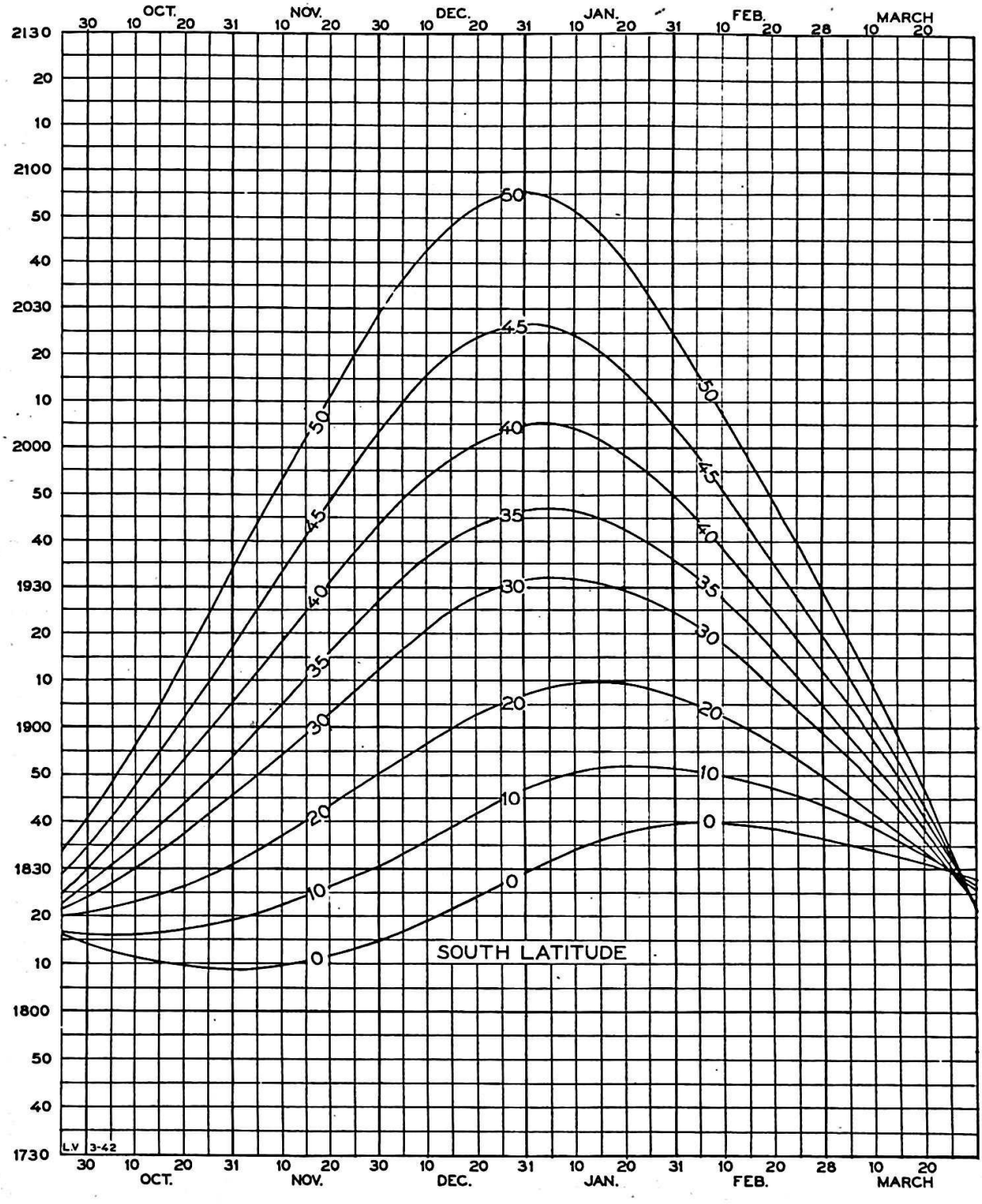
SOUTHERN HEMISPHERE

Beginning of Civil Twilight

Civil Twilight begins when the sun is 6° below the horizon.

INSTRUCTIONS

1. Start at top or bottom scale with proper date and move vertically, up or down, to the curve for the observer's latitude.
2. From the intersection move horizontally to the left and read local civil time.
3. To find exact zone or standard time, *add* 4 minutes for each degree west, or *subtract* 4 minutes for each degree east of the standard meridian.
4. To convert standard time to war time, add one (1) hour.



EXAMPLE

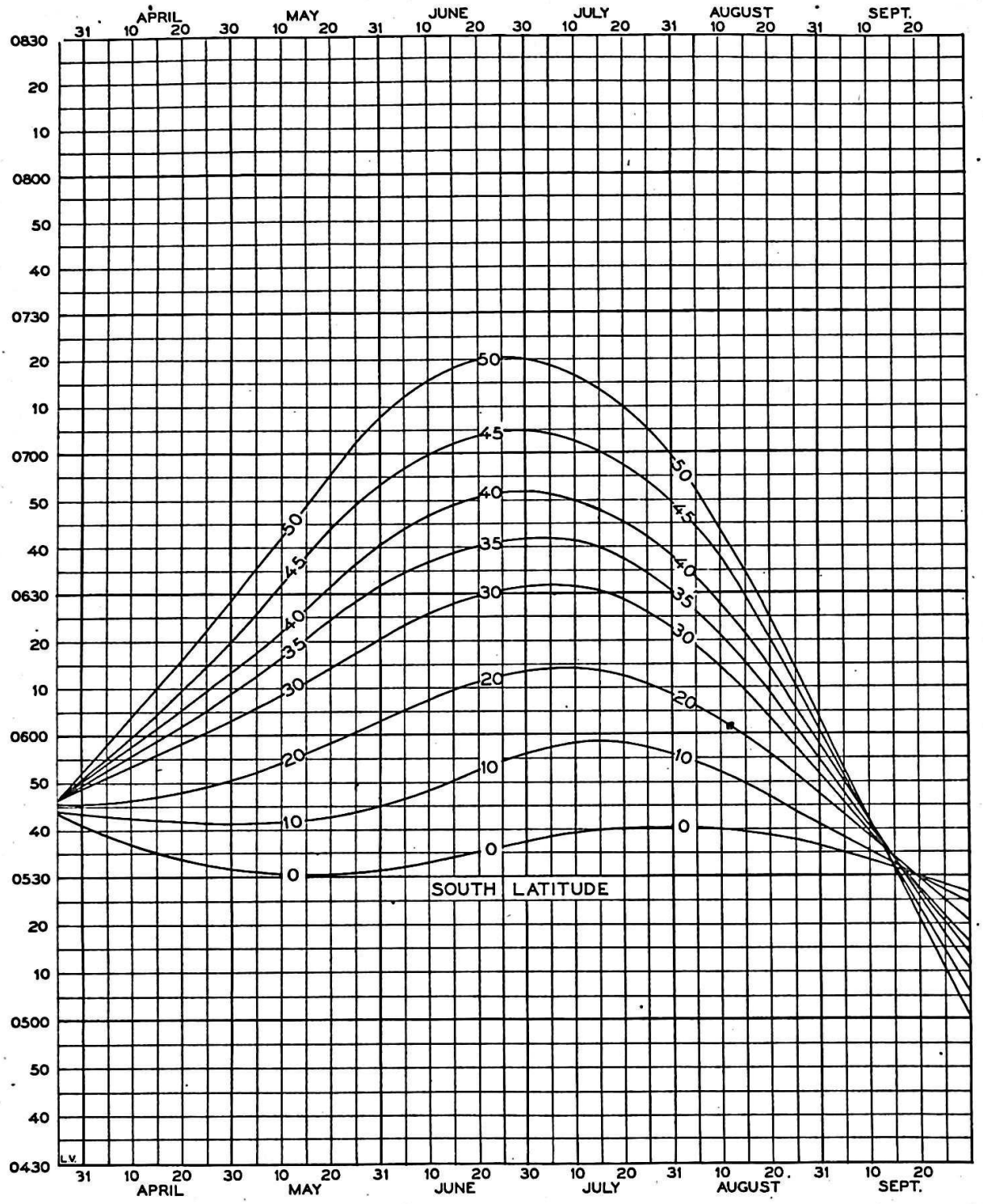
To determine the beginning of Civil Twilight at Capetown, Union of South Africa (Lat. 34°S. Long. 18°E.), on 31 Dec., follow the date line vertically to its intersection with the 34°S. latitude curve. From this point go to the left and read 1944. 18° being 12° east of the standard meridian (30°W.), add 48 minutes to 1944. Result: 2032, 30th meridian time.

DARKNESS

SOUTHERN HEMISPHERE

End of Civil Twilight

Civil Twilight ends when the sun is 6° below the horizon.



DAYLIGHT

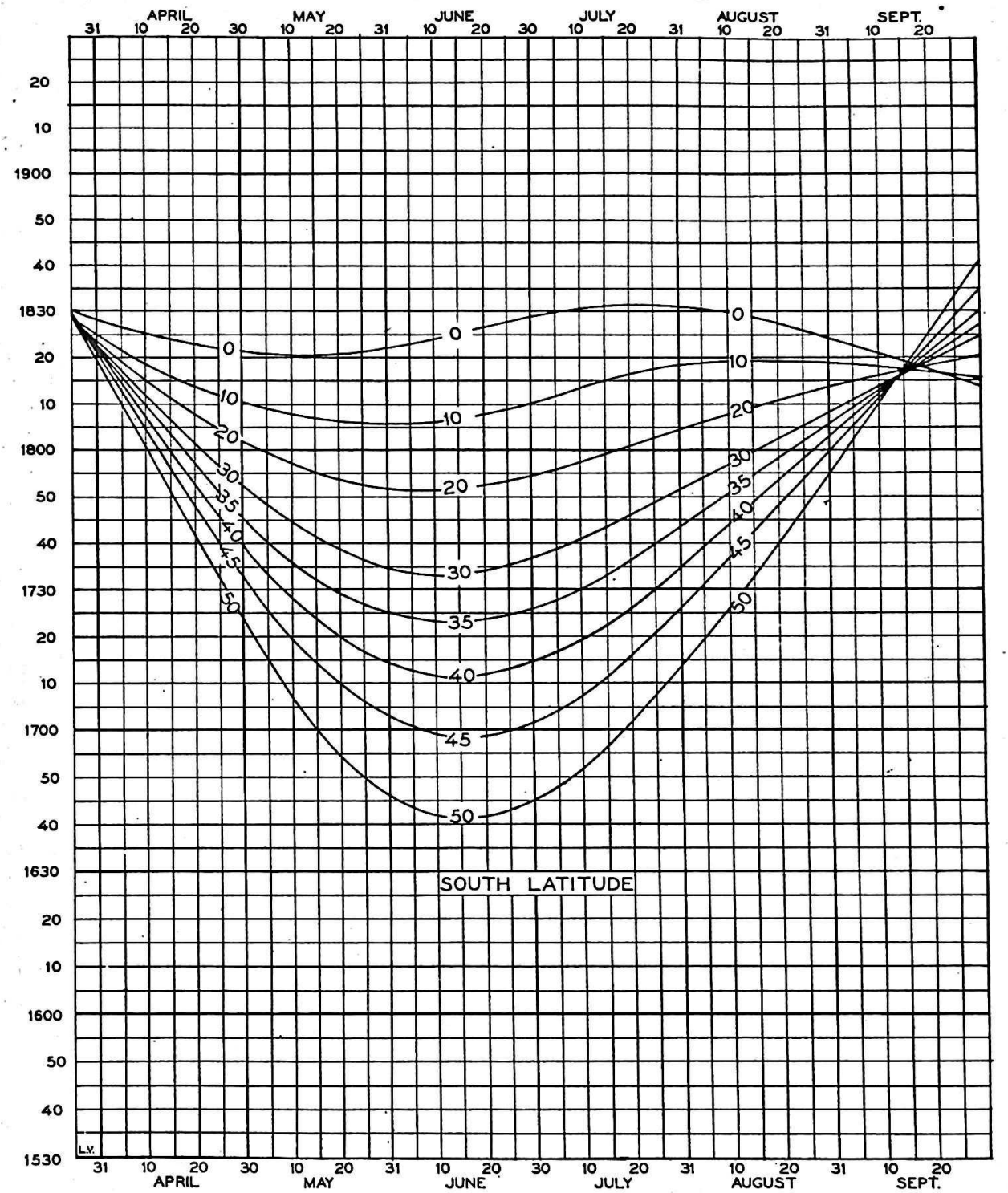
SOUTHERN HEMISPHERE

Beginning of Civil Twilight

Civil Twilight begins when the sun is 6° below the horizon.

EXAMPLE

To determine the beginning of Civil Twilight at Capetown, Union of South Africa (Lat. 30°S., Long. 18°E.), on 31 Dec., follow the date line vertically to its intersection with the 34°S. latitude curve. From this point go to the left and read 1944. 18° being 12° east of the standard meridian (30°W.), add 48 minutes to 1944. Result: 2032, 30th meridian time.



INSTRUCTIONS

1. Start at top or bottom scale with proper date and move vertically, up or down, to the curve for the observer's latitude.
2. From the intersection move horizontally to the left and read the local civil time.
3. To find exact zone or standard time, *add* 4 minutes for each degree west, or *subtract* 4 minutes for each degree east of the standard meridian.
4. To convert standard time to war time, add one (1) hour.

DARKNESS

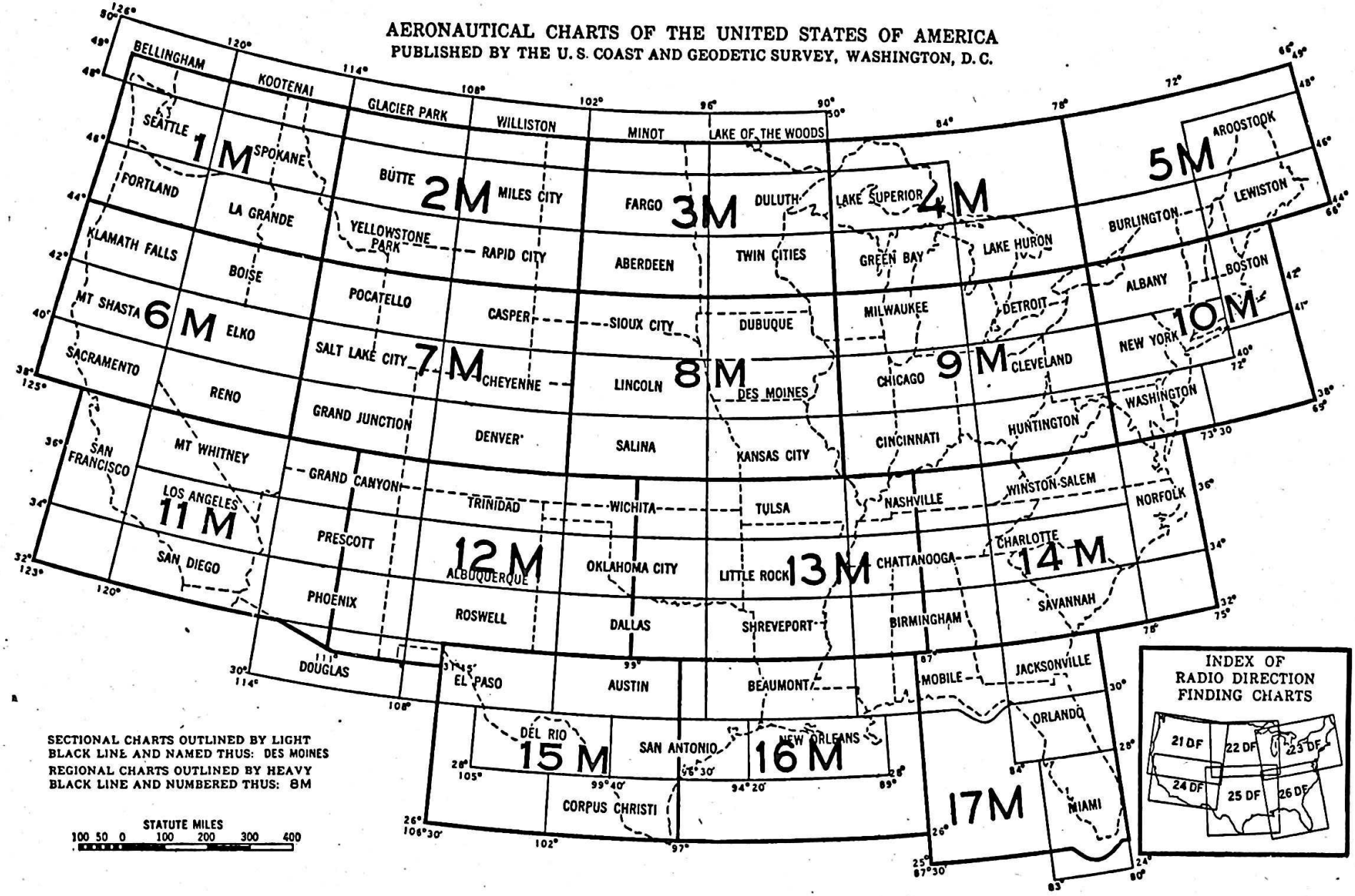
SOUTHERN HEMISPHERE

End of Civil Twilight

Civil Twilight ends when the sun is 6° below the horizon.

AERONAUTICAL CHARTS OF THE UNITED STATES OF AMERICA

PUBLISHED BY THE U. S. COAST AND GEODETIC SURVEY, WASHINGTON, D. C.



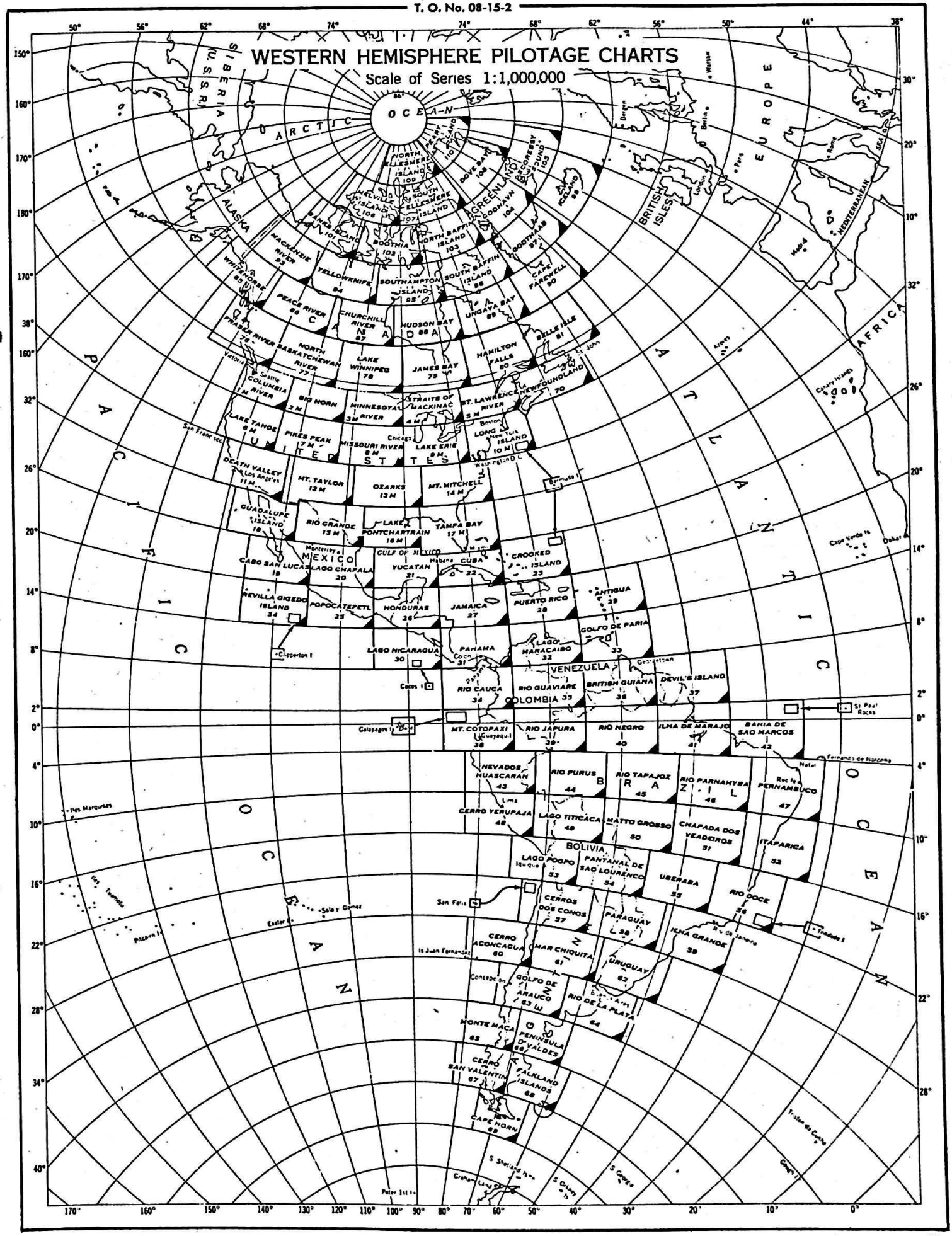
SECTIONAL CHARTS OUTLINED BY LIGHT BLACK LINE AND NAMED THUS: DES MOINES

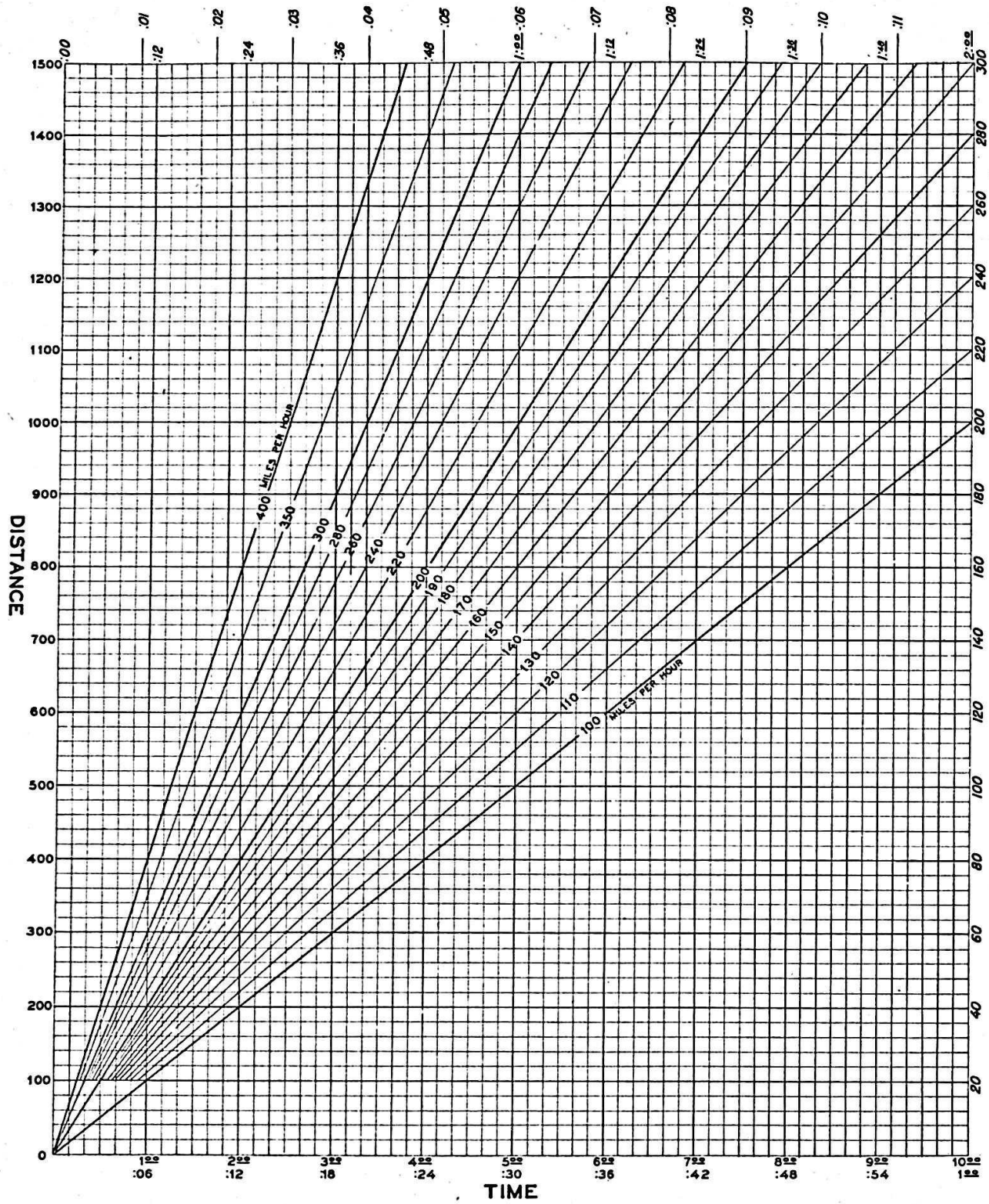
REGIONAL CHARTS OUTLINED BY HEAVY BLACK LINE AND NUMBERED THUS: 8M

STATUTE MILES

100 50 0 100 200 300 400

T. O. No. 08-15-2


WESTERN HEMISPHERE PILOTAGE CHARTS
Scale of Series 1:1,000,000
ARCTIC OCEAN
SIBERIA
ALASKA
GREENLAND
ICELAND
EUROPE
BRITISH ISLES
AFRICA
PACIFIC OCEAN
ATLANTIC OCEAN
MACKENZIE RIVER 93
YELLOWKNIFE 94
PEACE RIVER 95
CHURCHILL RIVER 97
HUDSON BAY 98
UNGAVA BAY 99
CAPE FARENELL 90
BELLE ISLE 91
HAMILTON FALLS 80
NEWFOUNDLAND 70
NORTH SASKATCHEWAN RIVER 77
LAKE WINNIPEG 78
JAMES BAY 79
COLUMBIA 1M RIVER
BIG HORN 3M
MINNESOTA 3M RIVER
STRAITS OF MACKINAC 4M
ST. LAWRENCE 5M RIVER
LAKE TAHOE 6M
PIKES PEAK 7M
MISSOURI RIVER 8M
LAKE ERIE 9M
LONG ISLAND 10M
UNITED STATES
DEATH VALLEY 11M
MT. TAYLOR 12M
OZARKS 13M
MT. MITCHELL 14M
GUADALUPE ISLAND 18
RIO GRANDE 15M
LAKE PONTCHARTRAIN 16M
TAMPA BAY 17M
CABO SAN LUCAS 19
LAGO CHAPALA 20
MEXICO
GULF OF MEXICO
YUCATAN 21
CUBA 22
CROOKED ISLAND 23
REVILLA GIGEDO ISLAND 24
POPOCATEPETL 25
HONDURAS 26
JAMAICA 27
PUERTO RICO 28
ANTIGUA 29
GOLFO DE PARIA
LAGO NICARAGUA 30
PANAMA 31
LAGO MARACAIBO 32
VENEZUELA
RIO CAUCA 34
RIO GUAVIARE 33
COLOMBIA
BRITISH GUIANA 36
DEVIL'S ISLAND 37
MT. COTOPAXI 38
RIO JAPURA 39
RIO NEGRO 40
ILHA DE MARAJO 41
BAHIA DE SAO MARCOS 42
NEVADOS HUASCARAN 43
RIO PURUS 44
RIO TAPAJOZ 45
RIO PARNAHYBA 46
RECIFE PERNAMBUCO 47
CERRO YERUPAJA 48
LAGO TITICACA 49
MATTO GROSSO 50
CHAPADA DOS VEADEIROS 51
ITAPARICA 53
BOLIVIA
LAGO POOPO 53
PANTANAL DE SAO LOURENCO 54
UBERABA 55
RIO DOCE 56
CERROS DOS CONOS 57
PARAGUAY 58
ILHA GRANDE 59
CERRO ACONCAGUA 60
MAR CHIQUITA 61
URUGUAY 62
GOLFO DE ARAUCO 63
RIO DE LA PLATA 64
MONTE MACA 65
PENINSULA VALDES 66
CERRO SAN VALENTIN 67
FALKLAND ISLANDS 68
CAPE HORN 69



INSTRUCTIONS FOR USE

This graph may be used to determine ETA's or ground speed, etc., when a computer is not available to the pilot.

FOR EXAMPLE: Reference to a chart shows the destination to be 200 miles from the present position of the aircraft and ground speed is 180 mph. Follow the horizontal line from the 200 index at the left to its intersection with the diagonal 180 mph. line. From the point thus found drop vertically down to the index at the bottom of the graph and read the answer, 1 hour 8 minutes. If greater accuracy is desired use the slant figures at the right and go vertically up to the slant figures at the top of the graph. Answer, 1 hour and 7 minutes.

By dropping the last digit of the index figures along the right and left sides of the graph the resultant mileage is 1/10 of the former, and the outside figures at the top and bottom of the graph give the time for these mileages after computation.

RADIO TELEPHONE PROCEDURES

In Radio Telephone communication the accuracy with which messages are received depends on the transmitting pilot's and/or operator's clearness of speaking. Correct understanding of all speech over the radio must be effected through clear enunciation. Loud talking into the microphone is unnecessary and will make clear reception very difficult. When speaking into the microphone it should be held about 1 inch from the lips. When numerals are to be transmitted, as in altimeter settings, a slight pause before and after each will materially assist. Radio Telephone transmissions will be made in a concise and business like manner, omitting irrelevant words and phrases. In order to reduce transmission time for tower messages, to decrease misunderstandings, and to insure more positive instructions, phraseologies have been standardized for use by the pilot and airport traffic control.

THE CALL

THE FULL CALL	EXAMPLE
Call sign of station being called: Patterson Radio	PATTERSON RADIO
This is	THIS IS
Call sign of sending station: Army 1234	ARMY 1234

THE TEXT

The text (subject matter) may consist of plain language, coded words, or figures. When spelling out becomes necessary the phonetic alphabet must be used.

THE ENDING

WORD	MEANING
OVER	My transmission is ended and I expect a reply from you. (Signifying that the transmitting station is switching over to receive.)
OUT	This conversation is ended and no reply is expected.

PROCEDURE PHRASES

The following phrases have been adopted and will be used in the text of the message when applicable.

WORD	MEANING
ROGER	I have received your last transmission.
WILCO	Your last message understood and will be complied with.
SAY AGAIN	Repeat (the word "repeat" will not be used in Radio Telephone transmission).

I SAY AGAIN I will repeat .....

PHONETIC ALPHABET

LETTER	SPOKEN AS	LETTER	SPOKEN AS	LETTER	SPOKEN AS
A	Able	I	Item	R	Roger
B	Baker	J	Jig	S	Sugar
C	Charlie	K	King	T	Tare
D	Dog	L	Love	U	Uncle
E	Easy	M	Mike	V	Victor
F	Fox	N	Nan	W	William
G	George	O	Oboe	X	X-Ray
H	How	P	Peter	Y	Yoke
		Q	Queen	Z	Zebra

CIVIL AIR REGULATIONS—AIR TRAFFIC RULES

This extract is intended for reference only; it will not be intended to replace the complete text of Civil Air Regulations.

1. APPROVED FLIGHT PLAN 60.134

A plan of flight, approved by C.A.A. Airways Traffic Control Center with respect to known air-traffic conditions. (An approved flight plan is required by the Airway Traffic Control Center into whose area an instrument flight will first enter.)

2. MINIMUM SAFE ALTITUDES 60.35 to 60.3504

CONTACT FLIGHTS: An altitude sufficient to land away from cities, settled areas, etc., in case of total power failure and not less than 1,000 feet over such areas. 500 feet above ground level and 500 feet from obstructions elsewhere; except military aircraft under specific orders, including supervised student instruction, may fly below 500 feet when necessary.

INSTRUMENT FLIGHTS: At least 1,000 feet above the level of the terrain and 1,000 feet from obstructions.

3. MAXIMUM SAFE ALTITUDES 60.351 to 60.3511

Aircraft, except military aircraft and especially authorized air carrier aircraft, shall not operate above 17,000 feet above sea level.

ABOVE 17,000 FEET SEA LEVEL: Military aircraft operating above 17,000 feet sea level must be equipped with two-way radio. Such aircraft, if flying within an Airway Traffic Control Area, must obtain clearance from A.T.C. before ascending to or descending from an altitude over 17,000 feet. Military aircraft operating at altitudes over 17,000 feet are exempt from all provisions of Part 60, C.A.R., except that lights must be used at night, and when flying WESTBOUND they shall fly at 500 feet above an EVEN thousand foot level, and when flying EASTBOUND they shall fly at 500 feet above an ODD thousand foot level when flying along or crossing routes used by an Air Carrier authorized to operate above 17,000 feet.

4. RIGHT SIDE TRAFFIC 60.342

CONTACT FLIGHTS: All traffic will fly to the right of on-course signals projected down the airway.

INSTRUMENT FLIGHTS: Outbound traffic will fly to the right of on-course signal. Inbound traffic may fly either to the right or in the on-course signal.

5. CONTACT FLIGHTS 60.130

Flight of aircraft during which the altitude and flight path can at all times be controlled by visual reference to the ground.

60.43

Flight plan is required at night or for formation flights (two or more aircraft) day or night when flying on or across the Civil Airways.

60.44 to 60.471

WITHIN CONTROL ZONES (3 miles from center of control airport): Minimum ceiling 1,000 feet and minimum visibility 3 miles, except that Airport Radio Control Tower Operators may authorize flight below 1,000 feet within control zones if the visibility is 1 mile or better.

OUTSIDE OF CONTROL ZONES: Minimum ceiling 1,000 feet; if flying below 1,000 feet during daytime, visibility must be 1 mile or better; if flying below 1,000 feet at night, visibility must be 2 miles or better; and if flying above 1,000 feet (above the ground) visibility must be 3 miles or better.

ON OR ACROSS CIVIL AIRWAYS: During daylight hours: Maintain prescribed flight altitudes. At night: Flight plan must be filed, and altitudes maintained in accordance with instrument flight rules. Formation flights must abide by this rule day or night.

CLOUDS OR OVERCAST: Aircraft must remain 500 feet vertically and 2,000 feet horizontally from clouds at all times.

WEATHER CHANGES: If weather conditions are encountered or anticipated en route which will not permit continued flight, land at nearest airport at which conditions permit contact flight, or change route and continue under contact conditions, or proceed under instrument flight rules if instrument flight plan was submitted and approved by Airways Traffic Control.

VITAL DEFENSE AREAS AND WITHIN ACTIVE AIR DEFENSE ZONES: Flight plans must be filed for all flights.

CIVIL AIR REGULATIONS—AIR TRAFFIC RULES

This extract is intended for reference only; it will not be intended to replace the complete text of Civil Air Regulations.

6. INSTRUMENT FLIGHTS

60.131 — ***INSTRUMENT FLIGHTS:*** Flight of aircraft in which visual reference to the ground is not continuously available, and the attitude of the aircraft and its flight path can be controlled in part or in whole by reference to instruments only.

60.52 — ***FUEL REQUIREMENTS:*** Sufficient fuel to complete flight and thereafter proceed to alternate airport and thereafter to fly for 45 minutes.

60.53 — ***FLIGHT PLAN:*** Must be submitted and approved by A.T.C. prior to start of flight.

60.530 — ***TRAFFIC CONTROL INSTRUCTIONS:*** Received from an Airway Traffic Control Center are binding upon all pilots.

60.105 — ***CONTROL ZONE OF INTERSECTION:*** Certain radio range stations, outside of the limits of airway traffic control areas, are designated centers of Control Zone of Intersection. (Control Zones of Intersection are shown in the Radio Facility Charts, T. O. No. 08-15-1.) Zones shall not be entered without first establishing contact with CAA communication station, and then reporting ETA over its center, the crossing altitude, and the course to be followed. There are no designated Control Zones of Intersection in the continental United States at present.

60.540 — ***WEATHER MINIMUMS:*** For landing and take-offs: 500-foot ceiling and 1 mile visibility, except that radio control tower operators at airports equipped with radio direction aids may authorize take-offs with ceiling 300 feet or better and visibility ½ mile or better.

60.55 — ***ALTERNATE AIRPORT:*** No take-off shall be made unless the flight plan includes a suitable alternate and weather reports indicate that conditions at the alternate will remain at or above the minimums: *a.* if alternate is equipped with radio range, ceiling 2,000 feet if overcast or 1,500 feet if broken clouds, and visibility 3 miles. *b.* if no radio range available, unlimited ceiling and visibility 3 miles.

60.56 — ***OVER THE TOP FLIGHTS:*** Will be governed by instrument flight rules.

60.570 — ***WEATHER CHANGES:*** If reports indicate less than minimums at destination, pilots shall not attempt landing, but shall proceed to alternate or other airport where weather conditions are above the minimums.

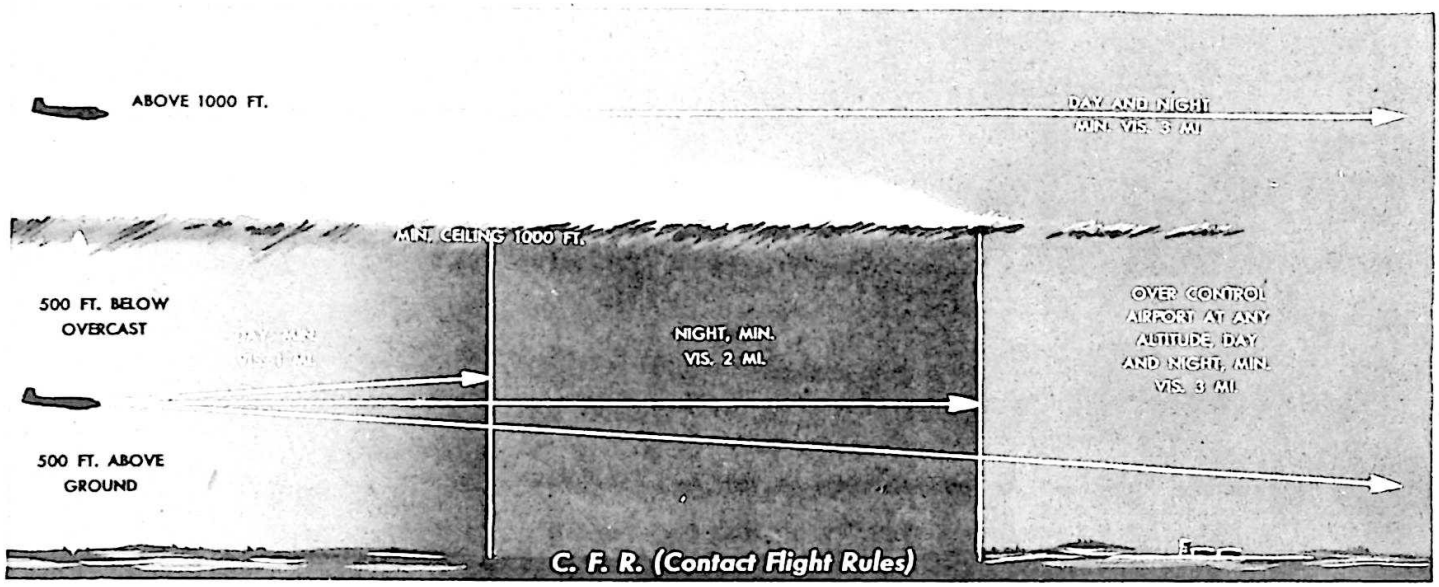
60.571 — ***COMMUNICATIONS CONTACTS:*** Maintain continuous listening watch on the appropriate frequency and report as soon as possible the time and altitude of passing each radio fix or other check point, also report unanticipated weather encountered and other pertinent information.

60.572 — ***COMMUNICATIONS FAILURE:*** In case of complete failure or if a pilot receives signals insufficient to maintain course, one of these procedures shall be observed: *a.* continue contact if possible; *b.* land at nearest suitable airport where contact weather exists and where no airways traffic control center is located; *c.* if sufficient radio signals are received, proceed according to flight plan with particular attention to last acknowledged instructions and maintaining last acknowledged altitude until the authorized approach time, after which landing may be made.

60.573 — ***FLIGHT PLAN CHANGES:*** No change to be made unless prior approval is obtained. If emergency requires immediate change, report action to nearest communication station as soon as possible.

60.58 — ***FLIGHT ALTITUDES:*** Shall be as stated in the flight plan and flights shall be conducted at ODD or EVEN thousand-foot altitude levels depending upon direction of flight, and color of airway along which flight is proceeding. (ODD and EVEN flight levels are indicated on the airways in the Radio Facility Charts, T. O. No. 08-15-1.)

60.586 — ***CROSSING AN AIRWAY:*** A civil airway shall not be crossed at an angle of less than 45°



MINIMUM CEILING AND VISIBILITY

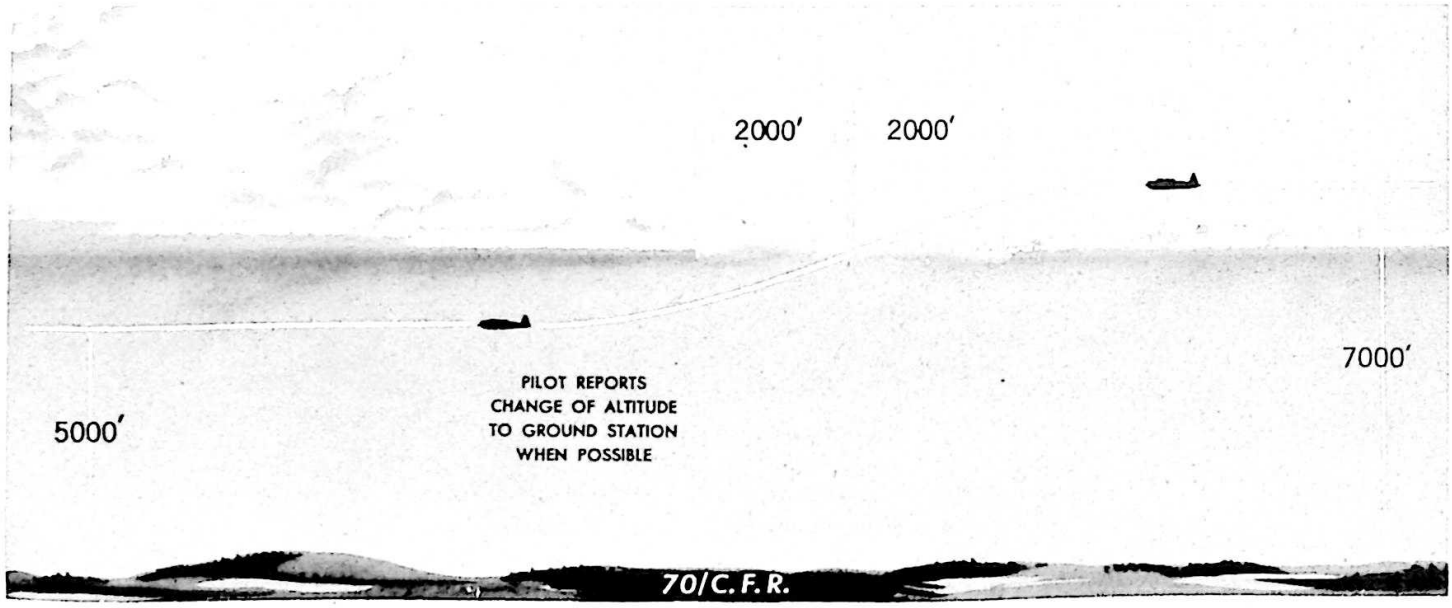
Aircraft flying within a level, at or below, 1000 ft. above the terrain may do so with a minimum of one mile visibility during the hours of daylight and a minimum of two miles at night. Aircraft flying above 1000 ft. above the terrain must have three miles visibility at all times. Aircraft must not fly closer than 2000 ft. to clouds horizontally, nor 500 ft. vertically, nor at an altitude less than 500 ft. above the terrain.

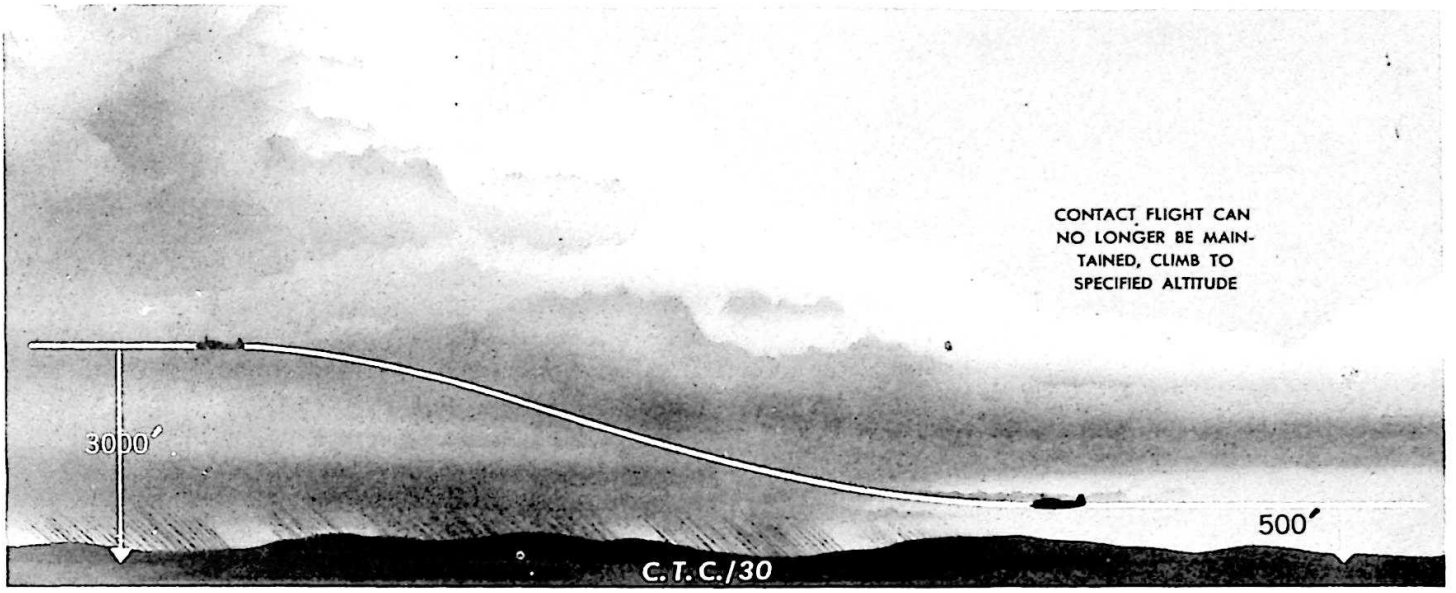
CONTACT FLIGHT

At designated "Control Airports" the thousand foot level does not apply and pilots flying within the control zone of such airports (3 Mile radius) must have at least three mile visibility at all times, unless the flight is otherwise authorized by the Air Traffic Control Tower Operator at such airport.

70/CFR (OR OTHER SPECIFIED ALTITUDE)

A flight plan containing a specified altitude followed by "CFR" (70/CFR) indicates that the pilot of the aircraft, submitting such a plan, proposes to maintain the specified altitudes as long as possible, but in any event the flight will be conducted at all times in accordance with the contact flight rules.





INSTRUMENT FLIGHT

GENERAL

Pilots must possess a valid instrument card. All instrument flight plans must be approved by Airway Traffic Control, if the flight will be conducted along or across the Civil Airways.

CTC/30 (CONTACT/ALTITUDE)

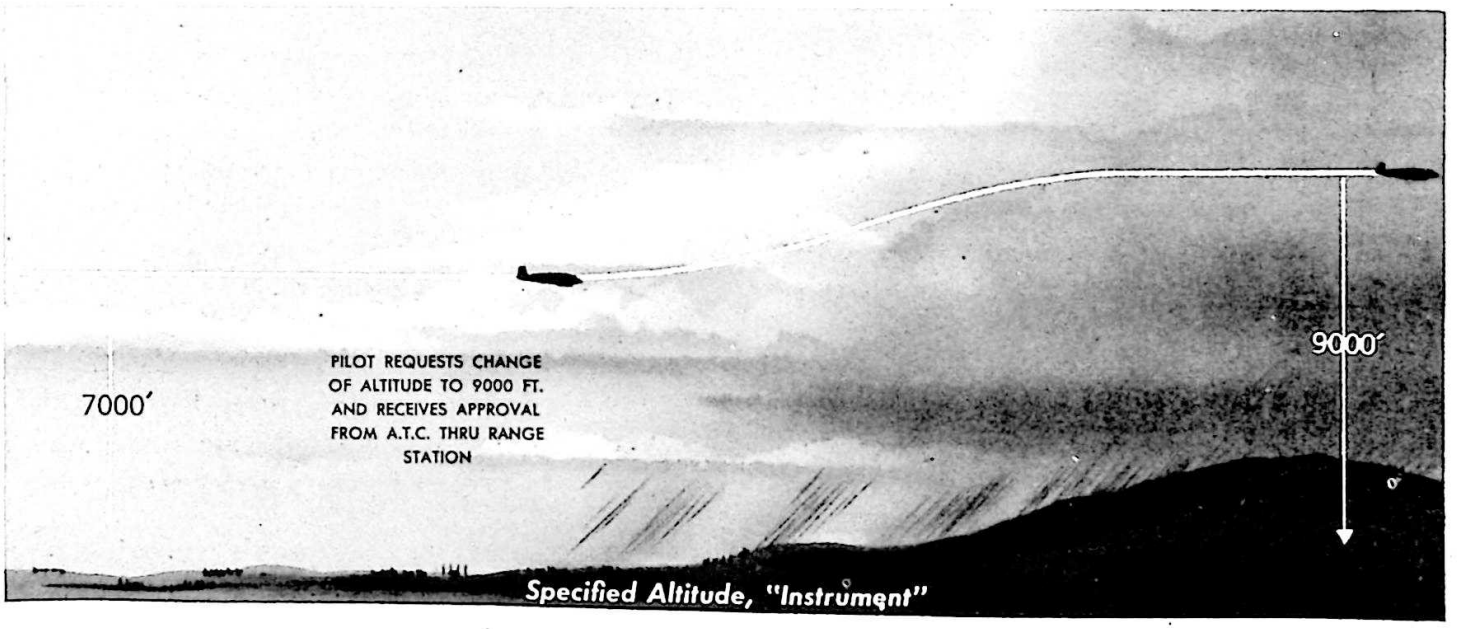
Under this type of instrument flight plan the pilot will fly contact as long as possible. If it is necessary to continue the flight "on instruments" the pilot must fly at the specified altitude. ATC will hold this altitude open for the flight, that is, no other aircraft will be authorized to fly at this altitude considering the time separation factor. The altitude specified must always be the minimum safe altitude for the route.

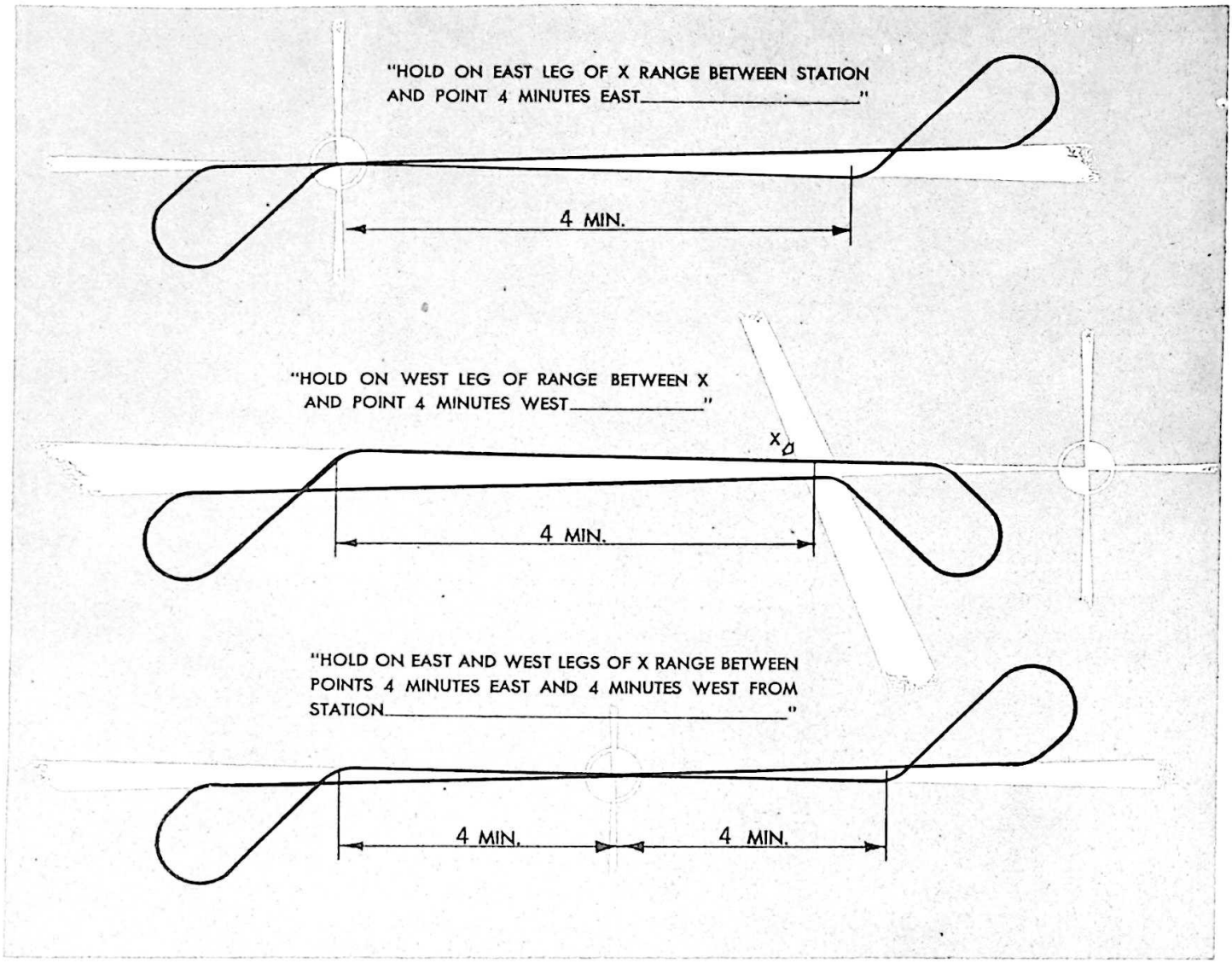
500 FEET ON TOP

This type of flight plan can be approved only during daylight hours. The flight may be conducted at any altitude above the overcast at the pilot's choice, except that the aircraft must not be flown closer than 500 feet to the top of the clouds. Clearance must be obtained before climbing or descending through the overcast.

SPECIFIED ALTITUDE

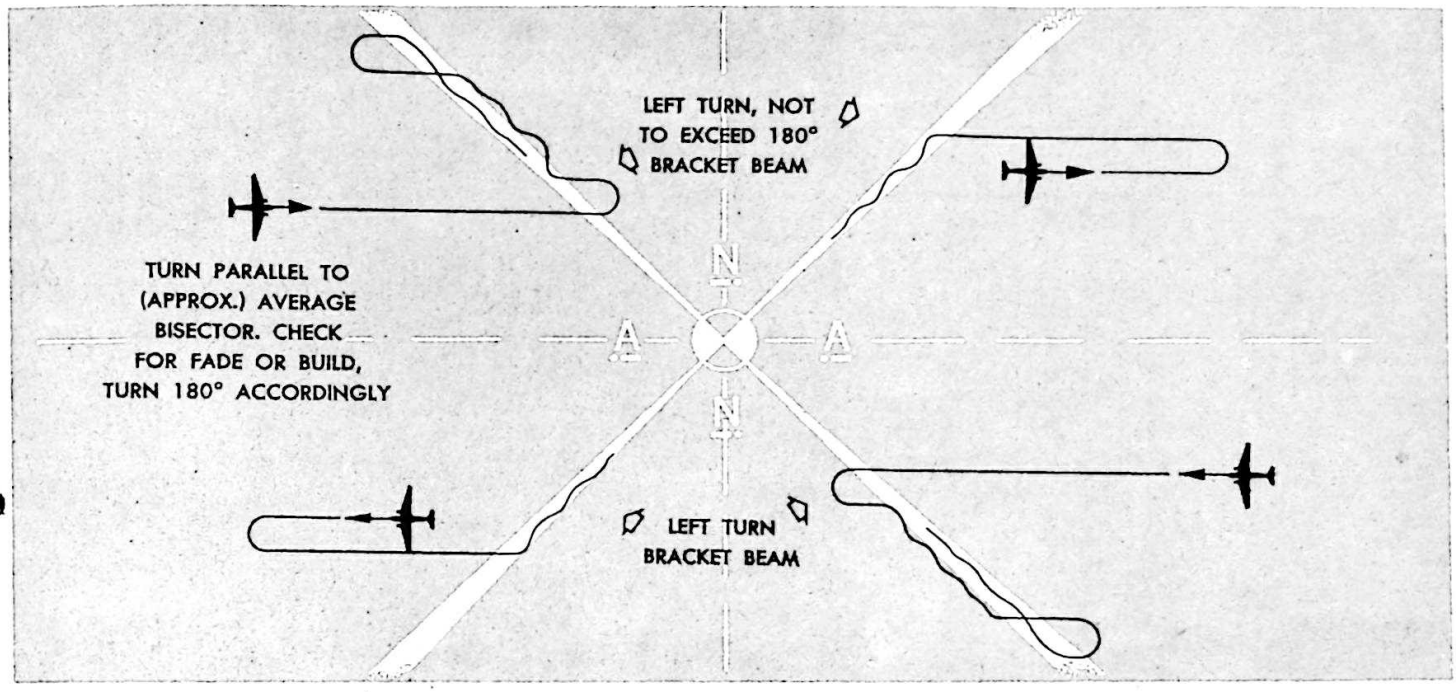
The pilot specifies an altitude level at which he proposes to fly to his destination.


PILOT REQUESTS CHANGE OF ALTITUDE TO 9000 FT. AND RECEIVES APPROVAL FROM A.T.C. THRU RANGE STATION
7000′
9000′
Specified Altitude, "Instrument"


"HOLD ON EAST LEG OF X RANGE BETWEEN STATION AND POINT 4 MINUTES EAST_____"
4 MIN.
"HOLD ON WEST LEG OF RANGE BETWEEN X AND POINT 4 MINUTES WEST_____"
X
4 MIN.
"HOLD ON EAST AND WEST LEGS OF X RANGE BETWEEN POINTS 4 MINUTES EAST AND 4 MINUTES WEST FROM STATION_____"
4 MIN.
4 MIN.

STANDARD HOLDING PROCEDURES

Airways traffic control frequently finds it necessary to hold aircraft over given points and at given altitudes, particularly when a number of aircraft approach the same airport for a landing under instrument flight conditions. Holding procedures will be conducted under airway traffic control (ATC) instructions. The point on which to hold will be specified by ATC and may be a radio range station or the intersection of two radio ranges. For instance, the instructions may be "hold 4 minutes east of blank radio fix at an assigned altitude such as 5000'." When the aircraft arrives over the airport for a landing under instrument flight conditions, an altitude will be assigned to the pilot. He will not change this altitude except when directed to do so by ATC. When instructed to hold, the pilot will receive directions such as " . . . maintain 4000', hold on west leg of "X" range between the station and a point 4 minutes west. Expect approach clearance at 2025'." As soon as the preceding aircraft lands he will be instructed to descend to 3000. Then he becomes number two to land. When the next preceding aircraft has landed, he will be number one to land, and the pilot will be given his approach clearance and cleared to the tower.



RADIO RANGE ORIENTATION

The pilot must know one satisfactory method of solving an orientation problem for use if ever he should become lost.

After the pilot has tuned in the radio range station, on which the system will be worked, he will turn parallel to either of the approximate bisector headings of the quadrant in which he is flying. The volume should first be turned up high. The pilot must listen carefully and note if background or the station identification of the opposite quadrant, can be heard. If the other station identification is audible, the pilot should decrease the volume until the second identification is just audible. Then, if this background fades in a short time, the aircraft must be on a heading which is taking it away from one of the on-course signals and a 180° turn should be made. Second, if no background is heard while the pilot has turned up the volume, he will decrease the volume to as low a level as is consistent with clear reception. He will hold the bisector heading and if a definite fade in signal strength is noted he will turn 180° and hold this heading until the beam is intercepted. If the signal strength is increasing on the original heading, he will readjust the volume control and continue flying the bisector heading until the beam is intersected. Upon reaching the beam, the pilot will fly through it and on the oppostite side turn left not to exceed 180° and bracket the beam.

After the brackets have been narrowed down to only a few degrees, he decreases the volume and checks for a fade or build just as was done in identifying the station. If the volume increases, the aircraft is on the leg headed toward the station. If the volume fades, the leg is identified as the one going away from the station. In the latter case, the pilot must do a procedure turn around and follow the beam to the station. If the compass heading and the published bearings of a beam happen to agree approximately, the beam is not definitely identified. Fade or build must be checked while flying on course.

AIRCRAFT FUEL

***NOTE:** Attention is invited to T. O. No. 00-35A-2, SUPPLY-AIRCRAFT FUEL AND OIL PRICE LISTS AND LOCATIONS, which is revised at frequent intervals and may alter information listed below.*

STATE AND STATION	FUEL GRADES 100	91	87
ALABAMA			
Anniston AAF	X	X	—
Birmingham AAF	X	X	—
Brookley Fld, Mobile	X	X	X
Courtland AAF	X	X	X
Craig Fld	X	X	X
Gunter Fld	—	—	X
Huntsville Arsenal	X	X	—
Maxwell Fld	X	X	X
Napier Fld	X	X	X
Tuskegee AAF	X	X	X
ARKANSAS			
Adams Fld	X	X	—
Blytheville AAF	X	X	X
Southwestern Pr. Grd, Hope	X	X	—
Stuttgart AAF	—	X	X
Texarkana MA	X	X	—
ARIZONA			
Ajo Gunnery Range	—	X	X
Coolidge AAB	X	X	—
Davis Monthan AAF	X	X	X
Douglas AAF	X	X	—
Gila Bend AAF	—	—	X
Kingman AAF	X	X	X
Luke Fld	X	X	X
Marana AAF	—	—	X
Williams Fld	X	X	X
Winslow MA	X	X	—
Yuma AAF	X	X	X
CALIFORNIA			
Blythe AAF	X	X	—
Burbank-Lockheed Term.	X	X	—
Chico AAF	—	X	X
Concord AAF	X	X	—
Delano AAF	X	X	—
Desert Tr Center	X	X	—
Estrella AAF	X	X	—
Fairfield-Suisan AAF	X	X	—
Gardner Fld	X	—	X
Glendale AAF	X	X	—
Half Moon Bay AAF	—	X	—
Hamilton Fld	X	X	X
Hammer Fld	X	X	—
Hayward Fld	X	X	—
Kern Co. Airport, Bakersfield	X	X	—
Lenoore AAF	X	X	X
Long Beach AAF	X	X	X
Lomita Flight Strip	X	X	—
March Fld	X	X	X
Marysville AAF	X	X	—
Mather Fld	X	X	X
McClellan Fld	X	X	—
Merced AAF	—	X	X
Metropolitan AP, Van Nuys	X	X	X
Mills Fld	X	X	—
Mines Fld	—	X	—
Minter Fld	—	X	X
Muroc AAF	X	X	—
Oakland AAF Drome	X	X	X
Ontario AAF	X	X	—
Oroville AAF	X	X	—
Oxnard Flight Strip, Oxnard	X	X	—
Palmdale AAF	X	X	—
Palm Springs AAF	X	X	—
Porterville AAF	—	X	—
Redbluff MA	X	X	—
Redding AAF	X	X	—
Rice AAF	X	X	—
Sacramento MA	X	X	—
Salinas AAB	X	X	X
San Bernardino AAF	X	X	X
Santa Ana AAB	X	X	X
Santa Maria AAF	X	X	X
Santa Rosa AAF	X	X	—
Stockton Fld	X	X	X
Thermal AAF	X	X	—
Victorville AAF	X	X	X
Visalia AAF	X	X	—
COLORADO			
Buckley Fld	X	X	—
La Junta AAF	X	X	X
Lowry Fld	X	X	—
Peterson Fld	X	X	—
Pueblo AAB	X	X	—
CONNECTICUT			
Bradley Fld	X	X	—
New Haven AAF	—	X	—
DELAWARE			
Dover AAF	X	X	—
New Castle AAF	X	X	—
DISTRICT OF COLUMBIA			
Bolling Fld	X	X	—
Washington Nat'l AP	X	X	—
FLORIDA			
Alachua AAF	X	X	—
Avon Park AAF	X	X	—
Bartow AAF	X	X	—
Boca Raton AAF	X	X	X
Buckingham AAF	X	X	X
Cross City AAF	X	X	—
Dale Mabry Fld	X	X	—
Drew Fld	X	X	—
Dunnellon AAF	X	X	—
Eglin Fld	X	X	X
Ft. Myers AAF	X	X	—
Hendricks Fld	X	X	X
Hialeah, 36th St. AP	X	X	—
Hillaborough AAF	X	X	—
Homestead AAF	X	X	—
Keystone AAF	X	X	—
Kissimmee AAF	X	—	—
Lakeland AAF	X	X	—
Mac Dill Fld	X	X	X
Marianna AAF	X	X	X
Miami Air Depot	X	X	—
Morrison Fld	X	—	—
Orlando AAB	X	X	—
Perry AAF	X	X	—
Pinecastle AAF	X	—	—
Pinellas AAF	X	X	—
Punta Gordo AAF	X	X	—
Sarasota AAF	X	X	—
Tyndall Fld	X	X	X
Venice AAF	X	X	—
GEORGIA			
Atlanta AAB	X	X	X
Bainbridge AAF	—	X	X
Camp Stewart AAF	X	X	—
Chatham AAF	X	X	—
Cochran Fld	X	X	X
Cordelle AAF	—	—	X
Daniel Fld	X	X	X
Harris Neck AAF	X	X	—
Hunter Fld	X	X	—
Lawson Fld	X	X	—
Marietta AAF	X	X	—
Moody Fld	—	X	X
Robins Fld	X	X	X
Spence Fld	X	X	X
Statesboro AAF	—	X	—
Thomasville AAF	X	X	—
Turner Fld	—	X	X
Waycross AAF	X	X	—
IDAHO			
Gowen Fld	X	X	X
Mountain Home AAF	X	X	—
Pocatello AAF	X	X	—

STATE AND STATION	FUEL GRADES 100	91	87
ILLINOIS			
Chanute Fld	X	X	X
Chicago MA	X	X	—
George Fld	X	X	X
Moline AP	X	X	—
Scott Fld	X	X	—
INDIANA			
Atterbury AAF	X	X	—
Baer Fld	X	X	—
Bendix Fld, South Bend	X	X	—
Evansville Mod Center	X	X	—
Freeman Fld	—	X	—
Indianapolis MA	X	X	—
Madison AAF	X	X	—
Stout Fld	X	X	—
IOWA			
Des Moines MA	X	X	—
Sioux City AAB	X	X	—
KANSAS			
Coffeyville AAF	X	X	—
Dodge City AAF	X	X	X
Fairfax AP	—	X	—
Garden City AAF	X	—	X
Great Bend AAF	X	X	—
Herington AAF	X	—	—
Independence AAF	—	X	X
Liberal AAF	X	X	X
Marshall Fld	X	X	—
Pratt AAF	X	—	—
Sherman Fld	X	X	—
Smoky Hill AAF	X	X	—
Strother Fld	X	—	X
Topeka AAF	X	X	—
Walker AAF	X	—	—
Wichita MA	X	X	—
KENTUCKY			
Bowman Fld	X	X	—
Campbell AAF	X	X	—
Godman Fld	X	X	—
Sturgis AAF	X	X	—
LOUISIANA			
Alexandria AAF	X	X	—
Barksdale Fld	X	X	—
De Ridder AAF	X	X	X
Esler Fld	X	X	—
Harding Fld	X	X	—
Lake Charles AAF	X	X	—
New Orleans AAB	—	X	—
Selman Fld	X	X	X
MAINE			
Dow Fld	X	X	—
Houlton AAF	X	X	—
Presque Isle AAF	X	X	—

STATE AND STATION	FUEL GRADES 100	91	87
MARYLAND			
Aberdeen Pr Gr (Phillips Fld)	X	X	—
Baltimore AAF	X	X	—
Camp Springs AAF	X	X	—
Edgewood Arsenal	X	X	—
MASSACHUSETTS			
Bedford AAF	X	X	—
Logan AP, East Boston	X	X	—
Westover Fld	X	X	—
MICHIGAN			
Kellogg Fld	X	X	—
Oscoda AAF	X	X	—
Romulus AAF	X	X	—
Selfridge Fld	X	X	—
MINNESOTA			
Rochester AP	X	X	—
St. Paul Mod Center No. 12	X	X	—
Wold-Chamberlain AP	X	X	—
MISSISSIPPI			
Columbus AAF	—	X	X
Greenville AAF	—	X	X
Greenwood AAF	—	X	X
Gulfport AAF	X	X	X
Hattiesburg AAF	X	—	—
Jackson AAB	X	X	X
Keesler Fld	X	X	X
Key Fld	X	X	X
MISSOURI			
Kansas City MA	X	X	—
Lambert Fld	X	X	—
Malden AAF	X	X	X
Rosecrans Fld	X	X	—
Sedalia AAF	X	X	—
Springfield MA	—	X	—
Vichy AAF	X	X	—
MONTANA			
Billings MA	X	—	—
Gore Fld	X	X	—
Great Falls AAB	X	X	X
Missoula MA	X	—	—
NEBRASKA			
Ainsworth AAF	X	X	—
Alliance AAF	X	X	—
Bruning AAF	X	X	—
Fairmont AAF	X	X	—
Grand Isle AAF	X	X	—
Harvard AAF	X	X	—
Kearney AAF	X	X	—
Lincoln AAF	X	X	—

STATE AND STATION	FUEL GRADES 100	91	87
McCook AAF	X	X	—
North Platte MA	X	X	—
Omaha MA	X	X	—
Scottsbluff AAF	X	X	—
NEVADA			
Indian Springs	X	X	—
Las Vegas AAF	X	X	X
Reno AAB	X	X	—
Tonopah AAF	X	X	—
NEW HAMPSHIRE			
Grenier Fld	X	X	X
NEW JERSEY			
Fort Dix AAB	X	X	—
Millville AAF	X	X	—
Newark AAF	X	X	X
NEW MEXICO			
Alamogordo AAF	X	X	—
Carlsbad AAF	X	X	X
Clovis AAF	X	X	—
Deming AAF	—	X	X
Fort Sumner AAF	—	X	—
Hobbs AAF	X	X	X
Kirtland Fld	X	X	X
Roswell AAF	—	X	X
NEW YORK			
Albany MA	—	X	—
Buffalo MA	X	X	—
La Guardia AP	X	X	—
Mitchel Fld	X	X	—
Niagara Falls MA	X	X	—
Rome AAF	X	X	—
Steward Fld	X	X	—
Suffolk Co. AAF	X	X	—
Syracuse AAB	X	X	—
NORTH CAROLINA			
Asheville AAF	—	X	—
Bluethenthal Fld	X	X	—
Camp Davis AAF	X	X	—
Camp MacKall AAF	X	X	—
Greensboro-High Point MA	X	X	—
Laurinburg-Maxton AAB	X	X	—
Morris Fld	X	X	—
Pope Fld	X	X	—
Raleigh-Durham AAF	X	X	—
Seymour-Johnson Fld	X	X	—
Winston-Salem MA	X	X	—
NORTH DAKOTA			
Bismarck MA	X	X	—
Fargo MA	X	X	—

STATE AND STATION	FUEL GRADES 100	91	87
OHIO			
Akron MA	X	X	—
Cleveland MA	X	X	—
Clinton County AAF	X	X	—
Dayton AAF	X	X	—
Lockbourne AAB	X	X	—
Lunken Fld	X	X	—
Patterson Fld	X	X	—
Wright Fld	X	X	—
OKLAHOMA			
Altus AAF	—	X	X
Ardmore AAF	X	X	—
Enid AAF	—	—	X
Frederick AAF	—	X	X
Great Salt Plains Range	—	X	—
Muskogee AAF	X	X	—
Post Fld	X	X	—
Tinker Fld	X	X	X
Tulsa MA	X	X	—
Will Rogers Fld	X	X	—
Woodward AAF	X	X	—
OREGON			
Medford AAF	X	X	—
Pendleton Fld	X	X	—
Portland AAB	X	X	X
Redmond AAF	X	X	—
PENNSYLVANIA			
Connellsville MA	X	X	—
Olmsted Fld	X	X	X
Pittsburgh MA	X	X	—
Reading AAF	X	X	—
RHODE ISLAND			
Hillsgrove AAF	X	X	—
SOUTH CAROLINA			
Aiken AAF	X	X	—
Charleston AAF	X	X	—
Columbia AAB	X	X	—
Florence AAF	X	X	—
Greenville AAF	X	X	X
Myrtle Beach AAB	X	X	—
Shaw Fld	X	X	X
Spartanburg MA	—	X	—
Walterboro AAF	X	X	—

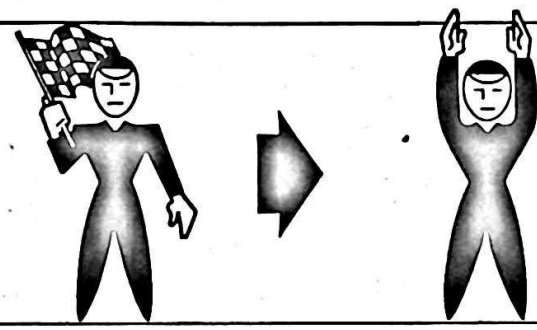
STATE AND STATION	FUEL GRADES 100	91	87
SOUTH DAKOTA			
Pierre AAF	X	—	—
Rapid City AAF	X	X	—
Sioux Falls AAF	X	X	—
Watertown AAF	X	X	—
TENNESSEE			
Berry Fld	X	X	—
Dyersburg AAF	X	X	—
Knoxville MA	X	X	—
Memphis MA	X	X	—
Northern Fld	X	X	—
Smyrna AAF	X	X	X
Tri City AP, Johnson City	—	X	—
TEXAS			
Abilene AAF	X	X	—
Abilene MA	X	X	—
Alamo Fld	X	X	—
Aloe AAF	X	X	X
Amarillo AAF	X	X	X
Austin MA	—	X	—
Bergstrom Fld	X	X	—
Biggs Fld	X	X	—
Big Springs AAF	X	X	X
Blackland AAF	X	X	X
Brooks Fld	X	X	X
Brownsville MA	X	X	—
Brownwood AAF	—	X	X
Bryan AAF	—	X	X
Childress AAF	—	X	X
Cox Fld	X	X	—
Dalhart AAF	X	X	—
Eagle Pass AAF	X	X	X
Ellington Fld	X	X	X
El Paso MA	X	X	—
Fort Worth AAF	X	X	X
Fort Worth MA	—	—	X
Foster Fld	X	X	X
Galveston AAF	X	X	—
Goodfellow Fld	X	X	X
Harlingen AAF	X	X	—
Hensley Fld	X	X	X
Hondo AAF	X	X	X
Kelly Fld	X	X	X
Laredo AAF	X	X	X
Laughlin Fld	X	—	X
Love Fld	X	X	—
Lubbock AAF	—	X	X

STATE AND STATION	FUEL GRADES 100	91	87
Majors Fld	—	X	X
Marfa Fld	—	—	—
Matagorda Is, Gun Range	—	—	X
Matagorda Peninsula	X	X	—
Midland AAF	X	X	X
Midland MA	X	X	X
Moore Fld	X	X	X
Palacios AAF	X	X	—
Pampa AAF	—	X	—
Pecos AAF	—	X	—
Houston MA	X	X	—
Perrin Fld	—	X	X
Pounds Fld	—	X	—
Pyote AAF	X	X	—
Randolph Fld	X	X	X
San Angelo AAF	—	X	X
San Marcus AAF	—	X	X
South Plains AAF	X	X	X
Sheppard Fld	X	X	X
Waco AAF	X	—	X
UTAH			
Hill Field	X	X	—
Wendover Fld	X	X	—
VIRGINIA			
Blackstone AAF	X	X	—
Langley Fld	X	X	—
Norfolk MA	X	X	—
Richmond AAB	X	X	—
WASHINGTON			
Boeing Fld	X	X	—
Ellensburg AAF	X	X	—
Ephrata AAF	X	X	—
Geiger Fld	X	X	—
McChord Fld	X	X	—
Moses Lake	X	X	—
Paine Fld	X	X	—
Spokane AD	X	X	—
Walla Walla	X	X	—
WISCONSIN			
Billy Mitchell Fld	X	X	—
Truax Fld	X	X	—
WYOMING			
Casper AAF	X	X	—
Cheyenne MA	X	X	X

HAND SIGNALS FOR TAXIING

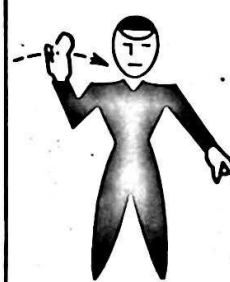
THESE SIGNALS, PRESCRIBED BY AAF REGULATION 62-10, DATED 2 AUGUST 1943, REPLACE ALL FORMER SIGNALS. THEY WILL BE USED BY CREWS OF AAF, USN, USMC, RAF, RCAF, AND RN.

1. The SIGNALMAN will direct taxiing from a position forward of the left wing tip of the airplane.
2. TOWING: The left wing tip signalman gives all signals to tractor driver.



A FLAGMAN will direct the pilot toward the taxi signalman who will stand with arms extended above head.

COME AHEAD



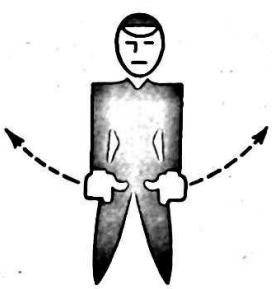
RIGHT TURN

TURNS

Signal with hand on same side as wing to be brought around. Point to wheel to be braked.

LEFT TURN

STOP



INSERT CHOCKS

SLOW DOWN

EMERGENCY STOP

START ENGINE

Give "Emergency Stop," point to engine, rotate other hand.

ALL CLEAR (OK)

CUT ENGINES

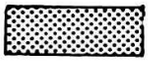
PULL CHOCKS

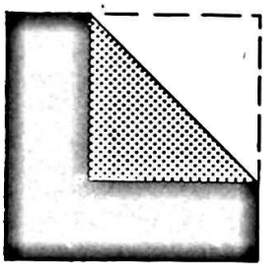
NIGHT OPERATION

In the dark . . . use lights for these signals. For EMERGENCY STOP, cross lights in front of face.

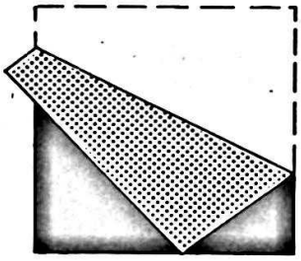
PANEL SIGNALS

Many emergency kits, now supplied, contain a large signal panel, roughly 10 ft. by 10 ft. This panel is blue on one side and yellow on the other. Messages can be transmitted to rescue pilots by folding the panel as indicated in the following illustrations.

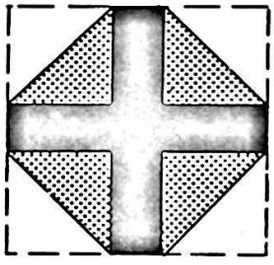
BLUE  YELLOW



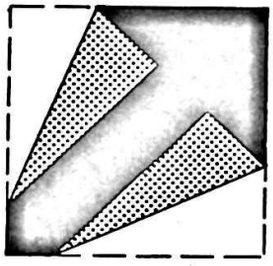
NEED GASOLINE AND OIL, PLANE IS FLYABLE



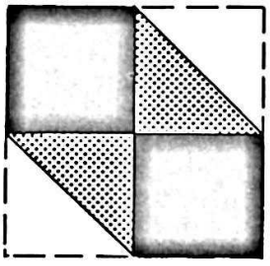
NEED TOOLS PLANE IS FLYABLE



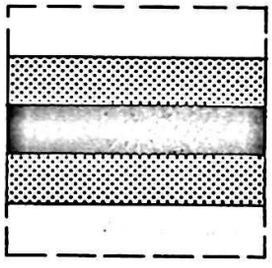
NEED MEDICAL ATTENTION



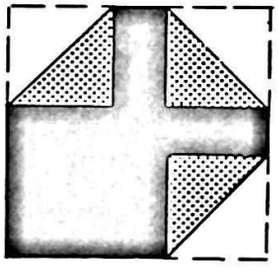
OK TO LAND ARROW SHOWS LANDING DIRECTION



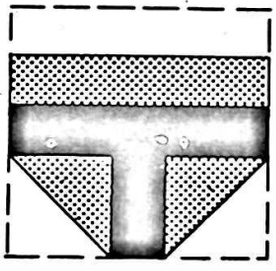
DO NOT ATTEMPT LANDING



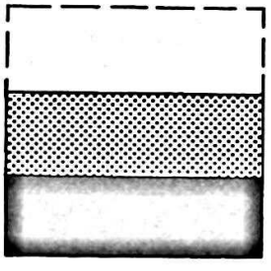
INDICATE DIRECTION OF NEAREST CIVILIZATION



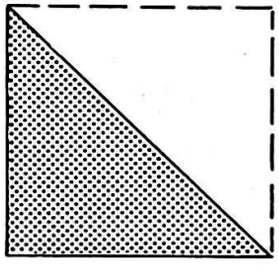
NEED FIRST-AID SUPPLIES



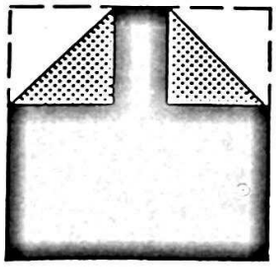
NEED QUININE OR ATABRINE



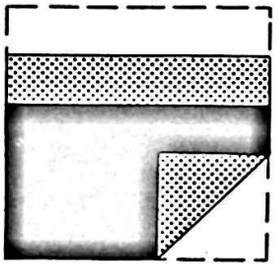
SHOULD WE WAIT FOR RESCUE PLANE?



NEED FOOD AND WATER



NEED WARM CLOTHING



HAVE ABANDONED PLANE—WALKING IN THIS DIRECTION

Immediately after being forced down the panel should be spread on the ground, flat. Use the yellow side if the terrain background is dark and the blue side if it is light.

Rescue pilots will indicate their understanding of the signals by dipping the nose of the plane several times for the affirmative and by fishtailing for the negative.

VISUAL EMERGENCY SIGNALS

Need Medical Assistance—URGENT

Used only when life is at stake

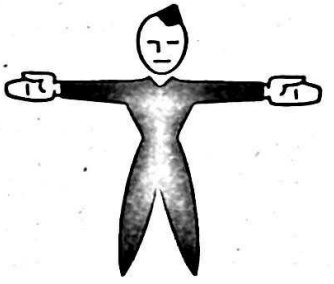
Lie Prone

ALL OK—Do Not Wait

Wave one arm overhead

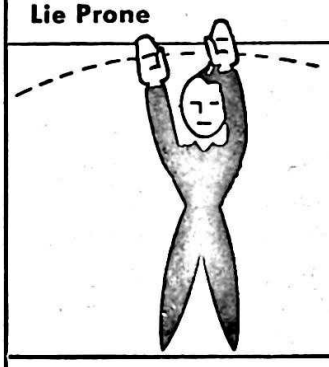
Can Proceed Shortly—Wait if Practicable

One arm horizontal



Need Mechanical Help or Parts—Long Delay

Both arms horizontal



Do Not Attempt To Land Here

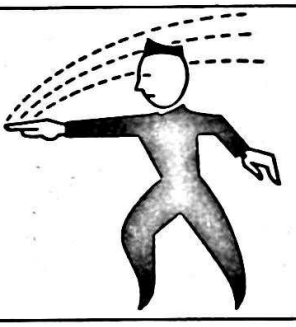
Both arms waved across face

Land Here

Both arms forward horizontally, squatting and pointing in direction of landing—Repeat

Our Receiver Is Operating

Cup hands over ears



Use Drop Message

Make throwing motion

Affirmative (Yes)

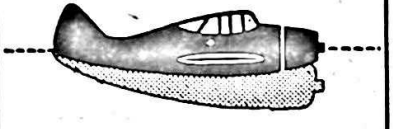
White cloth waved vertically

Negative (No)

White cloth waved horizontally

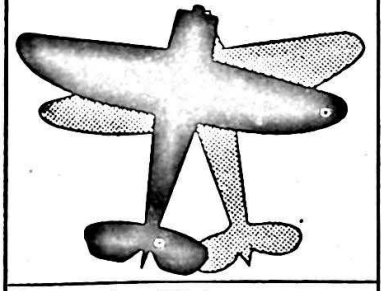
Pick Us Up—Plane Abandoned

Both arms vertical



Affirmative (Yes)

Dip nose of plane several times



Negative (No)

Fishtail plane

HOW TO USE THEM

If you are forced down and are able to attract the attention of the pilot of a rescue airplane, the body signals illustrated on this page can be used to transmit messages to him as he circles over your location. Stand in the open when you make the signals. Be sure that the background, as seen from the air, is not confusing. Go through the motions slowly and repeat each signal until you are positive that the pilot understands you.

INVOICE

The following extract of AAF Regulation 15-15, dated 1 March 1944, is quoted for the information of flying personnel.

I—GENERAL.

1. AAF FORMS 15 AND 15A. The use of AAF Form 9, "Flight Envelope," is hereby abolished. In lieu thereof, AAF Form 15A "Invoice Envelope," will be used by all personnel of the AAF concerned with emergency purchase of necessary supplies and services.

2. NECESSARY SUPPLIES AND SERVICES DEFINED:

a. Necessary supplies for which AAF Form 15 is used will be considered to be those necessary to operate or safeguard the aircraft and will consist of aviation fuels and oils, anti-freeze liquids, and miscellaneous supplies and materials.

b. Necessary services will generally consist of mechanical services, storage, civilian guards, etc., as authorized.

II—AAF FORM 15A, "INVOICE ENVELOPE"

3. DESCRIPTION OF FORM. AAF Form 15A consists of a brown KRAFT envelope which will be used as a container for a pad of ten (10) sets of invoices, AAF Form 15, and six (6) franked envelopes, size 3⅞ x 8⅞, for mailing purposes.

4. STORAGE AND ISSUE. AAF Forms 15A, containing a pad of invoices, AAF Form 15, and envelopes, will be stocked by the base operations officer and issued to the pilot or crew chief upon request. The envelope will be placed in each airplane, except primary training airplanes on authorized airdrome flights, by the crew chief. Pilots of primary training airplanes on other than routine airdrome flights will be furnished Form 15A, containing the necessary Form 15 and envelopes.

III—AAF FOR 15, "INVOICE"

11. GENERAL. AAF Form 15 will be used by all authorized personnel to invoice all emergency purchases of necessary supplies and services in accordance with instructions outlined below.

12. PREPARATION OF FORM 15:

a. AAF Form 15 will be legibly prepared in quadruplicate by use of pencil (indelible preferred), ink, or typewriter.

b. Invoices covering the purchase of aviation fuel, lubricants, and anti-freeze liquids will show the purchase price and state and local taxes, if any, separately. The tax rate per unit of issue will be entered in the spaces provided. While the various state and local tax laws are not universal in their application, as a general rule Government purchases are exempt from such taxes. However, a vendor who sells supplies to the U. S. Government is not, merely because of immunity of the Government from taxation, exempt from payment of a state tax when the legal incident of the tax falls on the vendor and not on the Government purchasing agency. In those cases, where the state and local taxes are levied against the vendor (seller) and not the vendee (purchaser), the state and local taxes should be included in the purchase price. The matter of state and local taxes must be determined on the basis of consideration of the particular state law involved.

c. All copies of AAF Form 15 covering the purchase of supplies and services will be signed by both the individual purchasing same and the dealer (full name) in the spaces provided therefor at the time purchase is made. The quadruplicate copy in all cases will be given to the dealer at the time of purchase. (This copy must be legible.) The original and remaining two (2) copies will in all cases be immediately mailed by the pilot or person making the purchase to the contracting officer of the base or station having jurisdiction of the flight, before continuing on his flight. The contracting officer will, upon receipt, draw the necessary purchase instruments and forward to the local supply officer and finance officer to effect payment to the vendor.

SEE FACSIMILE OF AAF FORM No. 15

WAR DEPARTMENT
AAF FORM NO. 15
(REVISED 1 JAN. 44)

WAR DEPARTMENT
ARMY AIR FORCES

INVOICE

DATE: 14 February 1944

THE UNITED STATES, DR.

TO: Breezy Aero Services, Inc.

ADDRESS (*Write plainly name and address of firm or individual from whom supplies or services were obtained*)
Dayton Municipal Airport, Vandalia, Ohio ..

Airplane Number	ARTICLES OR SERVICES	Quantity	Unit	Unit Price	Total
44-2354	(1) Aircraft gasoline, 100 Octane	200	Gal.	18	36 00
	(2) Aircraft Engine oil, Grade 120	25	qt.	12	3 00
				TOTAL	39 00

VENDOR'S CERTIFICATE

STATE TAX 0.05 LOCAL TAX NONE FEDERAL TAX 0.02 X (is not) included. Strike out words not applicable. Always insert unit tax for fuel and oil, percentage or other basis, if any tax is included for other commodities or services.

I certify that the above bill is correct and just; that payment therefor has not been received; that all statutory requirements as to American production and labor standards, and all conditions of purchase applicable to the transactions have been complied with; and that state or local sales taxes are not included in the amounts billed.

NAME OF FIRM	BY (*Print or Type*)	TITLE	SIGNATURE
BREEZY AERO SERVICE, INC.	M. L. SMITH	SALES MANAGER	M. L. Smith

PURCHASER'S CERTIFICATE

Pursuant to authority vested in me, I certify that the supplies enumerated above or on attached list have been received in good condition and in quantities as stated; that the services enumerated have been satisfactorily performed. That the supplies or services were purchased in an emergency for the maintenance, operation, or protection of government equipment and were necessary for the public service. I further certify that the aircraft for which the supplies or services were purchased to maintain and operate, is engaged on an authorized cross country flight or is assigned at the point of purchase under proper authority.

PRINTED NAME	ASN	GRADE	STATION	SIGNATURE
E. D. JONES	0-484533	CAPT., A.C.	BOLLING FLD., D.C.	E. D. Jones.

ACCIDENTS AND FORCED LANDINGS

Extract of A.A.F. Regulation 62-14

PART TWO—EMERGENCY PROCEDURES FOR ACCIDENTS AND OVERDUE AIRCRAFT

SECTION I—ACTION REQUIRED OF MILITARY PERSONNEL IN CASE OF ACCIDENT

23. *Action Required of Survivors or First Military Personnel at Scene.* Whenever any aircraft accident occurs, the flight commander or senior person not incapacitated, or in the event all occupants of the aircraft are incapacitated, the first AAF officer or other military person reaching the scene of the accident will perform such of the following duties as may be required by the situation:

a. Secure necessary medical attention or undertaker services.

b. Report to the commanding officer of the nearest AAF installation at which flying operations are conducted:

(1) Type, model, and location of the aircraft.

(2) Type of accident and approximate extent of damage.

(3) Name and home station of personnel aboard.

(4) Assistance required.

(5) Names of persons injured and extent of injuries.

(6) Action taken to care for injured.

(7) Place at which injured can be reached.

(8) Any other pertinent information.

c. Secure names and addresses of all available witnesses whose testimony may aid in the investigation of the accident.

d. Until relieved or otherwise instructed by proper authority, take whatever steps are necessary to assure that the aircraft or wreckage is not moved or tampered with in any way, except when necessary to assist or remove persons injured or killed or in the interest of safety. Otherwise, wreckage may be moved only by authority of a member of an Accident Investigating Board or Station Accident Officer.

e. Secure the necessary guard for the aircraft.

(1) When such accident has occurred at or near an Army station, the guard will be secured from the commanding officer thereof.

(2) If the accident has occurred at a distance from any Army station, the guard will be secured from civilian sources at the local rate of pay for each caretaker. (The pay of civilian caretakers will be handled on AAF Form 15, and will be forwarded promptly to the home station of the aircraft for payment.)